APPENDIX C

HEALTH AND SAFETY PLAN

OPERABLE UNIT 1

QUANTA RESOURCES SITE
EDGEWATER, NEW JERSEY

Prepared For:

Honeywell

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REVIEWED AND APPROVED BY:

Project Manager: _____ 5/18/05 Date

QA Officer: _____ 5/18/05 Date

May 2005

EMERGENCY CONTACTS

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations, contact should first be made with the site coordinator who will notify emergency personnel who will then contact the appropriate response teams. This emergency contacts list must be in an easily accessible location at the site.

Contingency Contacts	Phone Number
Ambulance	911
Fire	911 (Emergencies) (201) 945-2601
Garden State Underground (three working days notice required)	(800) 272-1000
National Response Center	(800) 424-8802
Palisades General Hospital 7600 River Road, North Bergen, NJ	(201) 854-5000
Poison Control Center	(800) 764-7661
Police	911 (Emergencies) (201) 943-2200
Qualisys (Parsons Contract Physician)	(800) 874-4676
Parsons Contacts	
Honeywell Program Manager: Robert Glenn	(973) 969-2313
Project Manager: Paul Feshbach-Meriney	(617) 457-7861
Office Health & Safety Representative and Site Safety Officer: Gregory Beck	(732) 537-3502
Field Leader: TBD	TBD
Honeywell Contacts	
Tim Metcalf	(973)-455-4107
Roy Redmond	(973)-455-2818

ROUTE TO HOSPITAL:

1.) Turn south on River Road.

2.) Continue South on RIVER RD/ CR-505 S toward OLD RIVER RD.

3.) Continue to follow CR-505 S to Palisades General Hospital.

4.) Palisades Medical Center is 0.81 miles from the site.

It is about five minutes to the Hospital.

Maps of the site location and the route to the hospital are included as Figures 1-1 and 1-2, respectively.

Table 1-0
Health And Safety Summary Table
Quanta Resources Site
Edgewater, New Jersey

Activities:

Topographical and geotechnical surveying, geoprobe and drilling operations, soil sampling, monitoring well installation, subsurface soil boring, ground water sampling, hydrogeologic investigations, and building surveys.

Action Limits:

Level D

If the level of volatile organic compounds is more than 1 ppm.

-Option: If Benzene (using detector tubes) is less than 0.5 ppm then an action level of more than 10 ppm may be used.

Level C

If the level of volatile organic compounds is more than 1 ppm.

-Option: If Benzene (using detector tubes) is more than 0.5 ppm then an action level of more than 10 ppm may be used.

Level B (or retreat)

If the level of volatile organic compounds is more than 1.5 ppm.

-Option: If Benzene (using detector tubes) is less 0.5 ppm, then an action level of more than 25 ppm may be used.

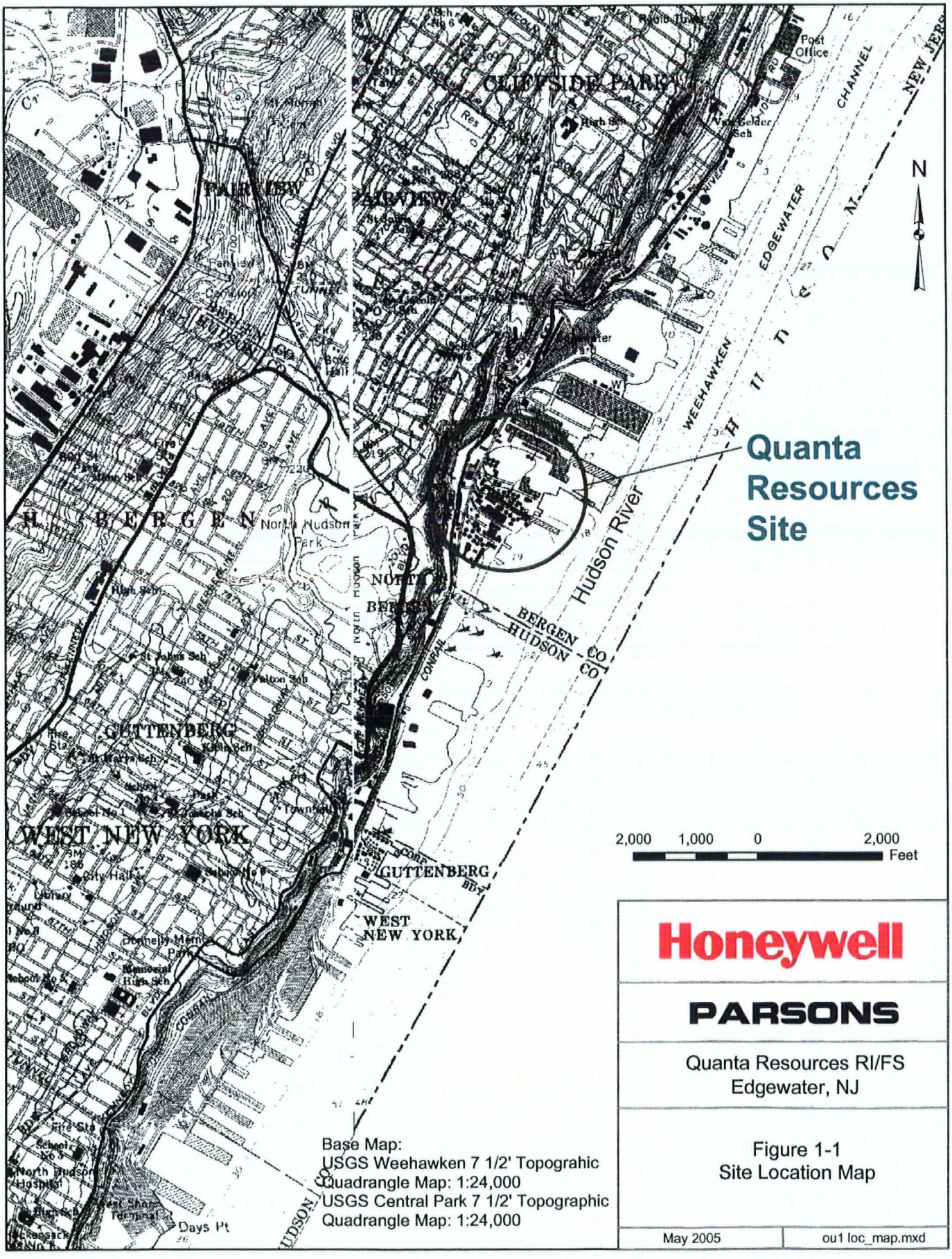
Explosimeter Action Level:

During sampling or drilling of monitoring wells or sediments if the LEL is over 10%, retreat until readings are verified as below 10%.

Note:

Readings must be sustained for a minute or more and will be net values where applicable.

FIGURES



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Quanta Resources RI/FS
Edgewater, NJ

Figure 1-1
Site Location Map

May 2005 | ou1 loc_map.mxd

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Quanta Resources RI/FS
Edgewater, NJ

Figure 1-2
Map to Nearest Hospital

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SECTION 1
INTRODUCTION

1.1 PURPOSE AND REQUIREMENTS

The purpose of this Health and Safety Plan (HSP) is to establish personnel protection standards and mandatory safety practices and procedures. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are being conducted at the Upland Area (OU1) at the Quanta Site.

The provisions of the plan are mandatory for all on-site personnel. Any supplemental plans used by subcontractors shall conform to this plan as a minimum. All personnel who engage in project activities must be familiar with this plan, and the attached Honeywell Contractor Safety Handbook (Attachment 7). They must then comply with their requirements, and sign the Plan Acceptance Form (Attachment 2), prior to working on the site. The Plan Acceptance Form must be submitted to the Parsons Health and Safety Officer.

1.2 SITE DESCRIPTION

The Quanta Site is a listed National Priorities List (NPL) site in Edgewater NJ, directly on the Hudson River, nestled in between newly constructed town homes and office complexes (Figure 1-1). The Quanta property is the site of a former coal tar processing plant that was operated by Allied Chemical (currently Honeywell) from the 1930s to 1974.

Allied Chemical sold the property to two real estate speculators who then leased the facility to various oil recycling companies. In 1980 the New Jersey Department of Environmetal Protection (NJDEP) closed the facility due to allegations of numerous regulatory violations.

Presently the property is vacant. There is a six-foot high chain-link fence surrounding the upland area of the property and an oil boom floating in the Hudson River east of the bulkhead.

The USEPA and Honeywell negociated to conduct a RI/FS to compile additional data to address data gaps within the investigation conducted to date. This HSP is provided to address health and safey concerns that may occur during the implementation of the RI/FS at OU1.

1.3 SCOPE OF WORK

The following are the site investigation tasks:

1. Soil borings and sampling,
2. Permanent and temporary monitoring well installation,
3. Ground water sampling and NAPL level measurements,

4. NAPL sampling,

5. Hydrological investigation (e.g., slug testing, tidal survey measurements, and seepage measurements in sediment),

6. Building surveys for indoor air quality assessment, and

7. Land (traditional and GPS) surveying.

1.4 PROJECT TEAM ORGANIZATION

Table 1-1 describes the responsibilities of all on-site personnel associated with this project. The names of principal on-site personnel associated with this project are delineated below:

Project Manager: Paul Feshbach-Meriney (Boston Office)

Field Team Leader: TBD (New Jersey Office)

Site Health and Safety Officer: Gregory Beck (New Jersey Office)

All Parsons personnel have been appropriately trained in first aid, hazardous waste safety procedures including the operating and fitting of personal protective equipment, and are experienced with the types of field operations to be employed at the Site.

TABLES

Table 1-1. On-site Personnel and Responsibilities

Table 1-1
On-Site Personnel and Responsibilities
Quanta Resources Site
Edgewater, New Jersey

PROJECT MANAGER - Reports to upper-level management. Has authority to direct response operations. Assumes total control over site activities.

Responsibilities:

- Prepares and organizes the background review of the situation, the Work Plan, the Health and Safety Plan, and the field team.
- Obtains permission for site access and coordinates activities with appropriate officials.
- Ensures that the Work Plan is completed and on schedule.
- Briefs the field teams on their specific assignments.
- Uses the Site Health and Safety Officer to ensure that health and safety requirements are met.
- Prepares the final report and support files on the response activities.
- Serves as the liaison with public officials.

SITE HEALTH AND SAFETY OFFICER - Advises the Project Manager on all aspects of health and safety on site. Stops work if any operation threatens worker or public health or safety.

Responsibilities:

- Periodically inspects protective clothing and equipment.
- Ensures that protective clothing and equipment are properly stored and maintained.
- Controls entry and exit at the Access Control Points.
- Coordinates health and safety program activities with the Office Health and Safety Representative.
- Confirms each team member's suitability for work based on a physician's recommendation.
- Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue.
- Implements the Health and Safety Plan.
- Conducts periodic inspections to determine if the Health and Safety Plan is being followed.
- Enforces the "buddy" system.
- Knows emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Notifies, when necessary, local public emergency officials.
- Coordinates emergency medical care.

Table 1-1
On-Site Personnel and Responsibilities
Quanta Resources Site
Edgewater, New Jersey

- Sets up decontamination lines and the decontamination solutions appropriate for the type of chemical contamination on the site.
- Controls the decontamination of all equipment, personnel, and samples from the contaminated areas.
- Assures proper disposal of contaminated clothing and materials.
- Ensures that all required equipment is available.
- Advises medical personnel of potential exposures and consequences.
- Notifies emergency response personnel by telephone or radio in the event of an emergency.

FIELD TEAM LEADER - Responsible for field team operations and safety.

Responsibilities:

- Manages field operations.
- Executes the Work Plan and schedule.
- Enforces safety procedures.
- Coordinates with the Site Health and Safety Officer in determining the personal protection level.
- Enforces site control.
- Documents field activities and sample collection.
- Serves as a liaison with public officials.

WORK TEAM - Drillers, samplers. The work party must consist of at least two people.

Responsibilities:

- Safely completes the on-site tasks required to fulfill the Work Plan.
- Complies with the Health and Safety Plan.
- Notifies Site Health and Safety Officer or supervisor of suspected unsafe conditions

SECTION 2
RISK ANALYSIS

2.1 CHEMICAL HAZARDS

Potential compounds that may be encountered while conducting field tasks at the project site and their relevant properties are shown in Table 2-1.

The primary chemical hazard is potential exposure to coal tars, many of which are potential carcinogens. There are also PCBs, BTEX (benzene, toluene, ethylbenzene, and xylene), polynuclear aromatic hydrocarbons (PAHs) and free floating petroleum products usually as a sheen in a monitoring well. Benzene is a known human carcinogen and teratogen. All of the volatile compounds will have an aromatic odor potentially causing dizziness, headaches and narcotic effects.

In addition to the compounds detected on Site, some of the solvents used in the processing of samples and for the decontamination of equipment are potentially hazardous to human health if they are not used properly. Material Safety Data Sheets for these compounds are included in Attachment 3. Some or all of these compounds may be used in the current tasks to be performed at the Site.

2.2 PHYSICAL HAZARDS

2.2.1 Heat Stress

The use of protective equipment, if required, may create heat stress. Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature is 70°F or above. Table 2-2 presents the suggested frequency for such monitoring. Table 2-3 presented heat index information. Monitoring frequency should increase as ambient temperature increases or as slow recovery rates are observed. Heat stress monitoring should be performed by a person with a current first-aid certification who is trained to recognize heat stress symptoms. For monitoring the body's recuperative abilities to excess heat, one or more of the following techniques will be used. Other methods for determining heat stress monitoring; such as the wet bulb globe temperature (WBGT) Index from American Conference of Governmental Industrial Hygienist (ACGIH) TLV Booklet can be used.

To monitor the worker, measure:

- Heart rate. Count the radial pulse during a 30-second period as early as possible in the rest period.
- If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 100 beats per minute at the next rest period, shorten the following work cycle by one-third.

- Oral temperature. Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).
- If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period.
- If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following cycle by one-third.
- Do not permit a worker to wear a semi permeable or impermeable garment when oral temperature exceeds 100.6°F (38.1°C).

2.2.2 Prevention of Heat Stress

Proper training and preventative measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress the following steps should be taken:

- Adjust work schedules.
  - Modify work/rest schedules according to monitoring requirements.
  - Mandate work slowdowns as needed.
  - Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, i.e., eight fluid ounces (0.23 liters) of water must be ingested for approximately every eight ounces (0.23 kg) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
  - Maintain water temperature 50° to 60°F (10° to 16.6°C).
  - Provide small disposable cups that hold about four ounces (0.1 liter).
  - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
  - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
- Train workers to recognize the symptoms of heat related illness.

2.2.3 Cold-Related Illness

If work on this project is conducted in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally labeled frostbite.

Hypothermia. Hypothermia is defined as a decrease in the patient core temperature below 96°F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interference with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include: shivering, apathy, listlessness, sleepiness, and unconsciousness.

Frostbite. Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20°F. Symptoms of frostbite are: a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

2.2.4 Prevention of Cold-Related Illness

- Educate workers to recognize the symptoms of frostbite and hypothermia
- Identify and limit known risk factors:
- Assure the availability of enclosed, heated environment on or adjacent to the site.
- Assure the availability of dry changes of clothing.
- Develop the capability for temperature recording at the site.
- Assure the availability of warm drinks.

Monitoring

Start (oral) temperature recording at the job site:

- At the Field Team Leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20°F, or wind-chill less than 30°F with precipitation).
- As a screening measure whenever any one worker on the site develops hypothermia.

Any person developing moderate hypothermia (a core temperature of 92°F) cannot return to work for 48 hours.

2.2.5 Slip, Trip, and Fall Hazards

The entire site may contain a number of slip, trip, and fall hazards for site workers, such as :

- Holes, pits, or ditches;
- Slippery surfaces;
- Steep grades;
- Uneven grades;
- Sharp objects, such as nails, metal shards, and broken glass;
- Wooden pier in poor condition at and near the bulkhead.

Such hazards should be corrected or eliminated immediately. If the hazard cannot be immediately removed, then the On-Site Safety and health officer must take action to warn site workers of the hazard to prevent injury. The signs, signals, and barricades used to warn and protect site workers from these hazards will be in accordance with OSHA (refer to 29 CFR parts 1926.200 through 1926.202).

2.3 TASK HAZARDS ANALYSIS

2.3.1 Topographical Survey

Topographical surveying will be performed in select areas of the site. These activities will include walking over various surfaces while inspecting for artifacts, measuring grade levels, and various other site tasks. In general, surveying work will take place above ground, without appreciable risk of coming in contact with contaminated soil. This work will, at minimum, require all personnel to wear Level D health and safety protection, using the guidance outlined above for respiratory/personal protective upgrades. Measures to protect personnel from skin contact with contaminated surface soils and construction debris shall be taken.

2.3.2 Soil Borings and Soil Sampling

Employees may be working next to an active drill rig, so drilling safety applies to their activities. Other hazards include risk of slip, trip and fall, lacerations and contusions, noise-induced hearing loss from exposure to excessive noise from a drill rig or generator. Employees shall keep clothing dry with adequate rain gear. Use proper personal protective clothing, to include splash protection if baling by hand during sampling. Inspect equipment to ensure that it is in proper working order. All handling of potentially contaminated soils or groundwater will begin in Level D with careful monitoring of the sampler's breathing zone using the Photoionization Detector (PID) or equivalent. Outer nitrile and inner latex gloves will be included in standard Level D requirements whenever handling samples. If contaminated soils will be tracked with safety shoes, then overboots or boot covers shall be used to contain soils to the exclusion zone.

2.3.3 Direct-Push Drilling

Hazards associated with direct-push drilling include contact with underground utilities, potential impact from falling objects, potential injury from moving equipment, and noise-

induced hearing loss. Clear utilities with local contacts before advancing any geoprobe device into the soil. Inspect equipment to ensure that it is in proper working order and all guards are in place. Use earplugs, canal caps, or ear muffs for hearing protection while operating the equipment. All handling of potentially contaminated soils or groundwater will begin in Level D with careful monitoring of the sampler's breathing zone using the Photoionization Detector (PID) or equivalent. Outer nitrile and inner latex gloves will be included in standard Level D requirements whenever handling samples. If contaminated soils will be tracked with safety shoes, then overboots or boot covers shall be used to contain soils to the exclusion zone.

2.3.4 Ground Water Sampling

Hazards of handling ground water samples include potential exposure to chemicals listed in Section 2. Other hazards include risk of slip, trip and fall, lacerations and contusions. Employees shall keep clothing dry with adequate rain gear. Use proper personal protective clothing. Inspect equipment to ensure that it is in proper working order. All handling of potentially contaminated ground water will begin in Level D with careful monitoring of the sampler's breathing zone using the Photoionization Detector (PID) or equivalent. Eye protection will be included as the standard Level D requirements whenever handling samples. Outer nitrile and inner latex gloves will be included in standard Level D requirements whenever handling samples. If contaminated soils will be tracked with safety shoes, then overboots or boot covers shall be used to contain soils to the exclusion zone.

2.3.5 Drilling / Monitoring Well Installation

Refer to Section 6.1.1 and to the drilling protocol included in Attachment C-5 for drilling safety requirements. Chemical exposure typically occurs as drill cuttings are brought to the surface. Drill cuttings and split spoon samples will be screened with a PID or equivalent. If breathing zone contaminant levels reach action limits as specified in Section 3, upgrades in personal protection will be initiated. Eye protection will be included as the standard Level D requirements whenever conducting drilling operations. All personnel involved in drilling operations will wear leather work gloves as part of the standard Level D requirements. Drill cuttings may be containerized as they accumulate in order to control volatile emissions in the driller's breathing zone and to prevent release of chemical vapors off site. Drillers and geologists on site within 50 feet of the drill rig shall start work in Level D PPE and will include use of hearing protection when the rig is operational.

2.3.6 Near Water Safety

Normal precautions if one worked near the water (e.g,. soil borings or wells installed near water) would include:

1. Wearing a Personal Floatation Device (PFD).

2. Having 200 feet of rope and a life ring available.

3. Having an emergency rescue boat available (as necessary).

2.3.7 Biological Hazards

Symptoms of Rocky Mountain Spotted Fever, that are caused by tick bites, include fever chills, headache, abdominal, muscle pain, and nausea. A red rash develops at the wrist and ankles two to five days after exposure. Symptoms develop two to fourteen days after exposure.

Symptoms of Lyme Disease, that are caused by deer ticks, include fatigue, stiffness (particularly in the neck). There may be a red circular rash. Fever may be present. Symptoms develop a few days to two years after exposure. Personnel exhibiting symptoms of Rocky Mountain Spotted Fever or Lyme Disease should consult a medical professional immediately.

Both of the above tick caused hazards as well as other insect such as mosquitoes and bees can be avoided by minimizing skin exposure (long sleeved shirts and pants taped at the ankle). Sprays and roll on repellants may also be used. Daily washings and frequent body inspections are recommended.

Skin-sensitizing (poisonous) vegetation produces a bumpy, swollen rash at the point of contact. This rash is easily spread if the oil gets on the fingers. Wash affected area(s) including tools as soon as possible. Use over-the-counter medications to reduce the irritation. Avoid scratching the rash. Cover the affected area(s) with clean dressings. Severe exposure may necessitate evaluation by a medical professional.

Personnel scratched and/or bitten by mammals will immediately clean the wound(s) and proceed to the hospital for medical evaluation.

TABLES

Table 2-1
Health Hazard Parameters of Hazardous Substances of Concern
Quanta Resources Site
Edgewater, New Jersey

Compound	PEL[a]	TLV[b]	Other[c]	Physical Description/Health Effects/Symptoms
Aldrin	0.25 mg/m^3	0.25 mg/m^3	IDLH = 25 mg/m^3	Colorless to dark brown crystalline solid with mild chemical odor. May cause headaches, dizziness, nausea/vomiting, and malaise.
Arsenic	0.01 mg/m^3 (29 CFR 1910.1018)	0.01 mg/m^3	IDLH = 5 mg As/m^3	Silver-gray or tin-white, brittle, odorless solid. Exposure may cause ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy; respiratory irritation, hemolytic anemia, cardiovascular instability.
Benzene	1 ppm (29 CFR 1910.1028)	0.5 ppm	STEL = 5 ppm	Aromatic odor, skin dermatitis, teratogen, human carcinogen, narcotic. Exposure to fumes may cause headache, dizziness and nervous system. Organic solvent, clear liquid; irritates eye, skin and respiratory tract
Chlorodiphenyl (42% Chlorine) (PCBs)	1 mg/m^3	1 mg/m^3	IDLH = 5 mg/m^3	Colorless to dark brown liquid with a mild hydrocarbon odor. Skin designation. May cause sin acne or rashes; bioaccumaulative; potential liver effects and anemia; human carcinogen.
Chlorodiphenyl (54% Chlorine) (PCBs)	0.5 mg/m^3	0.5 mg/m^3	--	Pale yellow, viscous liquid with a mild hydrocarbon odor. Skin designation. May cause sin acne or rashes; bioaccumaulative; potential liver effects and anemia; human carcinogen.
Coal Tar Pitch Volatiles	0.2 mg/m^3	0.2 mg/m^3	--	Black or dark brown, amorphous residue. Properties vary with specific compounds. Irritates eyes, skin, and respiratory tract. Causes dermatitis, bronchitis, and lung , skin, and kidney cancer. Carcinogen
Dichlorodiphenyltri-chloroethane (DDT)	1 mg/m^3	1 mg/m^3	IDLH = 500 mg/m^3	Colorless solid with a weak, chemical odor. . Paresthesia of tongue, lips, face; tremors; apprehension, dizziness, fatigue, confusion, malaise; headaches; convulsions; paresis of hands; vomiting; eye, skin irritation; (carcinogenic)
Dieldrin	0.25 mg/m^3	0.25 mg/m^3	IDLH = 50 mg/m^3	Colorless to light tan solid with a mild, chemical odor. Headaches; dizziness; nausea, vomiting, malaise; sweating; myoclonic limbjerks; clonic, tonic convulsions; coma; (carcinogenic) In animals: liver, kidney damage
Endrin	0.10 mg/m^3	0.10 mg/m^3	IDLH = 2 mg/m^3	Colorless to tan solid with a mild chemical odor. Epileptiform convulsions; stupor, headaches, dizziness; abdominal discomfort, nausea, vomiting; insomnia; aggressive confusion, lethargy, weakness; anorexia; In animals: liver damage
Ethylbenzene	100 ppm; 435 mg/m^3	100 ppm	STEL = 125 ppm	Colorless liquid with an aromatic odor. Irritation-Eye, Nose, Throat, Skin--- Moderate (HE15) Narcosis (HE8). Eye, mucous membrane irritation; headaches; dermatitis; dizziness; narcosis; coma.
Heptachlor	0.5 mg/m^3	0.5 mg/m^3	IDLH = 35 mg/m^3	Light tan, waxy solid with an odor like camphor. Tremors, convulsions, liver damage; (carcinogenic).

Table 2-1
Health Hazard Parameters of Hazardous Substances of Concern
Quanta Resources Site
Edgewater, New Jersey

Compound	REL[a]	TLV[b]	Other[c]	Physical Description/Health Effects/Symptoms
Hydrogen Sulfide	-----	10 ppm	Ceiling = 20 ppm (Z37.2-1966) Peak = 50 ppm (10 minutes once) STEL = 15 ppm	Colorless gas with a strong odor of rotten eggs. [Note: Sense of smell becomes rapidly fatigued & can NOT be relied upon to warn of the continuous presence of H_2S. Shipped as a liquefied compressed gas.] Apnea; coma; convulsions; irritated eyes, conjunctivitis pain, lacrimation, photophobia, corneal vesiculation; respiratory system irritation; dizziness; headaches; fatigue; insomnia; GI disturbances
Lead (29 CFR 1910.1025)	0.050 mg/m^3	0.050 mg/m^3	IDLH = 100 mg/m^3	A heavy, ductile, soft, gray solid. Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypotension
Lindane	0.5 mg/m^3	0.5 mg/m^3	IDLH = 50 mg/m^3	Colorless solid with a musty odor (pure material is odorless). Eye, nose, throat irritation; headaches; nausea; clonic convulsions; respiratory difficulty; cyanosis; aplastic anemia; skin irritation; muscle spasms; In animals: liver, kidney damage
Methoxychlor (as total dust)	15 mg/m^3	10 mg/m^3 TWA	IDLH = 5000 mg/m^3	Colorless to tan solid with a slight, fruity odor. Cumulative kidney damage None known in humans; In animals: fasiculation, trembling, convulsions; kidney, liver damage; (carcinogenic).
Naphthalene	10 ppm; 50 mg/m^3	10 ppm	STEL = 15 ppm	Colorless to brown solid (shipped as a molten liquid) with a mothball-like odor. Irritates eyes, skin, and bladder. Causes headaches, confusion, excitement, convulsions, coma, vague discomfort, nausea, vomiting, abdominal pain, profuse sweating, jaundice, hematoma, and hemoglobin in the urine, renal shutdown, dermatitis, optic nerve disorders, and corneal and liver damage. Experimental teratogen and questionable carcinogen.
Phenol	5 ppm; 19 mg/m^3	5 ppm	--	Skin designation. Colorless to light-pink, crystalline solid with a burning taste and a sweet acrid odor. Irritates eyes, nose, and throat. Causes anorexia, low-weight, weakness, muscle aches and pain, dark urine, blue skin. Skin burns, dermatitis, tremors, twitching, convulsions, and damage to the liver, kidneys, pancreas, spleen, and lungs. Ingestion can cause gangrene and corrosion of the lips, mouth, throat, esophagus, and stomach. Mutagen, experimental teratogen, and questionable carcinogen.
Toluene (Z37.12-1967)	200 ppm	50 ppm	Ceiling = 300 ppm Peak = 500 ppm (10 minutes)	Aromatic odor, skin dermatitis, teratogen, human carcinogen, narcotic. Exposure to fumes may cause headache, dizziness and nervous system. Organic solvent, clear liquid; irritates eye, skin and respiratory tract
Xylene	100 ppm; 435 mg/m^3	100 ppm	--	Aromatic odor, skin dermatitis, teratogen, human carcinogen, narcotic. Exposure to fumes may cause headache, dizziness and nervous system. Organic solvent, clear liquid; irritates eye, skin and respiratory tract

Table 2-1
Health Hazard Parameters of Hazardous Substances of Concern
Quanta Resources Site
Edgewater, New Jersey

Compound	PEL[a]	TLV[b]	Other[c]	Physical Description/Health Effects/Symptoms
a/ PEL = Permissible Exposure Limit. OSHA-enforced average air concentration listed in 29 CFR 1910.1000 Table Z-1 or Z-2. to which a worker may be exposed for an 8-hour workday without harm.				
b/ TLV = Threshold Limit Value – Time Weighted Average. Average air concentration (same definition as PEL, above) recommended by the American Conference of Governmental Industrial Hygienists (ACGIH), 2004 *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.*				
c/ Ceiling = maximum concentration/limit determined from breathing-zone air samples. IDLH = Immediately Dangerous to Life of Health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Peak = acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift. STEL = Short-Term Exposure Limit. Maximum employee exposure to an airborne concentration as average over any 15 minute period.				
d/ When a range is given, use the highest concentration				
e/ Ionization Potential, measured in electron volts (eV), used to determine if field air monitoring equipment can detect substance. Values are published by NIOSH				
f/ mg/m3 = Milligrams per cubic meter				
h/ NA = Not available				

Table 2-2
Suggested Frequency of Physiological Monitoring for Fit and Acclimated Workers [a]
Quanta Resources Site
Edgewater, New Jersey

Adjusted Temperature [b]	Normal work Ensemble [c]	Impermeable Ensemble
90°F or above (32.2°C) or above	After each 45 min. of work	After each 15 min. of work
87.5°F (30.8°-32.2°C)	After each 60 min. of work	After each 30 min. of work
82.5° - 87.5°F (28.1° - 30.8°C)	After each 90 min. of work	After each 60 min. of work
77.5° - 82.5°F (25.3° - 28.1°C)	After each 120 min. of work	After each 90 min. of work
72.5° - 77.5°F (22.5° - 25.3°C)	After each 150 min. of work	After each 120 min. of work

a. For work levels of 250 kilocalories/hour.

b. Calculate the adjusted air temperature (ta adj) by using this equation ta adj = ta °F + (13 X % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows).

c. A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

Table 2-3
Heat Index
Quanta Resources Site
Edgewater, New Jersey

	ENVIRONMENTAL TEMPERATURE (Fahrenheit)										
	70	75	80	85	90	95	100	105	110	115	120
RELATIVE HUMIDITY	APPARENT TEMPERATURE*										
0%	64	69	73	78	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	130
30%	67	73	78	84	90	96	104	113	123	135	148
40%	68	74	79	86	93	101	110	123	137	151	
50%	69	75	81	88	96	107	120	135	150		
60%	70	76	82	90	100	114	132	149			
70%	70	77	85	93	106	124	144				
80%	71	78	86	97	113	136					
90%	71	79	88	102	122						
100%	72	80	91	108							

*Combined Index of Heat and Humidity...what it "feels like" to the body
Source: National Oceanic and Atmospheric Administration

How to use Heat Index:
1. Across top locate Environmental Temperature
2. Down left side locate Relative Humidity
3. Follow across and down to find Apparent Temperature
4. Determine Heat Stress Risk on chart at right

Note: Exposure to full sunshine can increase Heat Index values by up to 15 degrees F.

Apparent Temperature	Heat Stress Risk with Physical Activity and/or Prolonged Exposure
90-105	Heat Cramps or Heat Exhaustion Possible
105-130	Heat Cramps or Heat Exhaustion Likely, Heat Stroke Possible
>130	Heatstroke Highly Likely

SECTION 3
PERSONNEL PROTECTION AND MONITORING

3.1 MEDICAL SURVEILLANCE

Parsons will utilize the services of a licensed occupational health physician with knowledge and/or experience in the hazards associated with the project to provide the medical examinations and surveillance specified herein.

Personnel involved in this operation have undergone medical surveillance prior to employment with their employer, and thereafter at 12-month intervals. The 12-month medical examination includes a complete medical and work history and a standard occupational physical. The examination includes: all major organ systems, complete blood count with differential (CBC), and a SMAC/23 blood chemistry screen which includes calcium, phosphorous, glucose, uric acid, BUN, creatinine, albumin, SGPT, SGOT, LDH, globulin, A/G ratio, alkaline phosphatase, total protein, total bilirubin, triglyceride, cholesterol, and a creatinine/BUN ratio. Additionally a pulmonary function test will be performed by trained personnel to record Forced Vital Capacity (FVC) and Forced Expiratory Volume in second ($FEV_{1.0}$). An audiogram and visual acuity measurement, including color perception, is administered. The medical exam is performed under the direction of a licensed Occupational Health Physician. The physician provides a medical certification regarding the fitness or unfitness for employment on hazardous waste projects. This evaluation includes any restrictions that may be indicated for each employee. The evaluation will be repeated as indicated by substandard performance or evidence of particular stress that is evident by injury or time loss illness on the part of any worker.

3.2 SITE SPECIFIC TRAINING

The Site Health and Safety Officer will be responsible for developing a site specific occupational hazard training program and providing training to all Parsons personnel that are to work at the site. All personnel who undergo this training shall sign the training documentation form included in Attachment 2 of this HASP. This training will consist of the following topics:

- Names of personnel responsible for site safety and health.
- Safety, health, and other hazards at the site.
- Proper use of personal protective equipment.
- Work practices by which the employee can minimize risk from hazards.
- Safe use of engineering controls and equipment on the site.
- Acute effects of compounds at the site.
- Water safety
- Decontamination procedures.

3.3 PERSONAL PROTECTIVE EQUIPMENT AND ACTION LEVELS

3.3.1 Conditions for Level D

Level D protection will be worn for initial entry on-site and initially for all activities. Monitoring shall demonstrate that atmospheric conditions in worker breathing zones meet the following criteria. All values are net: Downwind minus upwind. All values must be sustained for two minutes or more.

- PID readings less than 1 ppm
  - Option: If Benzene (using detector tubes) is less than 0.5 ppm then an action level of less than 10 ppm may be used.

Level D protection will consist of:

- Coveralls
- Safety boots w/ boot covers or over-boots.
- Nitrile outer and latex inner gloves (must be worn during all sampling activities)
- Hard hat (must be worn during drilling activities)
- Safety glasses (Splash goggles must be worn if a splash hazard is present)
- Leather work gloves (must be worn during drilling activities)
- Rubber boots (at least as high as the mid-calf) will be used in all sediment sampling

3.3.2 Conditions for Level C

The level of personal protection will be upgraded to Level C if any of the following conditions are met:

For Volatile Organic Compounds:

- If the level of volatile organic compounds is more than 1 ppm.
  - Option: If Benzene (using detector tubes) is more than 0.5 ppm then an action level of more than 10 ppm may be used.

Equipment Required For Level C

Level C protection will consist of:

- Full-face air-purifying respirator
- Tyvek overall suit
- Nitrile outer and Latex inner gloves
- Safety boots w/ boot covers or over-boots
- Hard hat (must be worn during drilling activities)
- Rubber boots (at least as high as the mid-calf) will be used in all sediment sampling

3.3.3 Conditions for Level B or Retreat

The level of personal protection will be upgraded to Level B if any of the following conditions are met:

- If the level of volatile organic compounds is more than 1.5 ppm.
  - Option: If Benzene (using detector tubes) is less 0.5 ppm, then an action level of more than 25 ppm may be used.

At this point the field team leader must consult with the Office Health and Safety Representative to discuss the options: (1) don Level B protection and continue; (2) wait until the concentration of volatile compound vapors fall below the above action limits.

Equipment Required For Level B

Level B protection will consist of:

- Airline or SCBA respirator with Grade D breathing air
- Poly-coated Tyvek® overall suit
- 5-minute escape SCBA (with airline only)
- Nitrile outer and latex inner gloves, taped at cuffs
- Safety boots w/ boot covers or over-boots
- Hard hat
- Rubber boots (at least as high as the mid-calf) will be used in all sediment sampling

OSHA Requirements for Personal Protective Equipment

All personal protective equipment used during the course of this field investigation must meet the following OSHA standards:

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133 29 CFR 1926.102	ANSI Z87.1-1968
Respiratory	29 CFR 1910.134 29 CFR 1926.103	ANSI Z88.1-1980
Head	29 CFR 1910.135 29 CFR 1926.100	ANSI Z89.1-1969
Foot	29 CFR 1910.136 29 CFR 1926.96	ANSI Z41.1-1967

ANSI = American National Standards Institute

Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.1025; 29 CFR 1910.134).

Air purifying respirators cannot be worn under the following conditions:

- Oxygen deficiency
- IDLH concentrations
- High relative humidity
- If contaminant levels exceed designated use concentrations.

3.4 MONITORING REQUIREMENTS

Monitoring for organic vapors in the breathing zone will be conducted with a Photovac MicroTIP® photoionization detector (PID) or equivalent. Readings will be taken under the following circumstances.

- Upon initial entry onto the site.
- When weather conditions change.
- When work begins on another portion of the site.
- Every five feet during drilling.

If site activities generate sustained, visible dust due to wind erosion of soils, a personal Data RAM meter will be obtained to monitor worker breathing zones for total dust levels. The site safety officer will also consider methods of wetting down the soil to reduce dust generation. Readings will consider upwind background dust levels as well as diesel particulate emissions from drill rigs or other heavy equipment before upgrades to higher levels of PPE are initiated.

Combustible gases may be present during drilling or well sampling. Since some of the compounds potentially present at the site are combustible, it will be necessary to monitor for combustible gasses. A combustible gas meter will be used to monitor during all drilling activities. Guidelines have been established by the National Institute for Occupational Safety and Health (NIOSH) concerning the action levels for work in a potentially explosive environment. These guidelines are as follows:

1) 10% LEL - Cease all activities in order to allow time for the combustible gases to vent. If the combustible gases in the well/bore hole are not diminished after allowing adequate time to vent, then the following steps should be taken:

- Obtain an air compressor (minimum 1.5 horsepower and explosion proof)
- Place the compressor a safe distance from the well (at least 20 ft.).
- Place hose into the well/hole until it reaches bottom.
- Run compressor for 15 minutes.

- Measure the percent LEL in the well/hole. If the reading continues above 10% LEL, continue to run the compressor. If levels are below 10% LEL, continue to monitor the well/hole for 5 minutes; if readings remain below 10% LEL, resume work, and continue to monitor.

SECTION 4
WORK ZONES AND DECONTAMINATION

4.1 SITE WORK ZONES

To reduce the spread of hazardous materials by workers from the contaminated areas to the clean areas, zones will be delineated at the Site. The flow of personnel between the zones should be controlled. The establishment of the work zones will help ensure that: personnel are properly protected against the hazards present where they are working, work activities and contamination are confined to the appropriate areas, and personnel can be located and evacuated in an emergency.

4.1.1 Exclusion Zone

Exclusion zones will be established at the Site for all drilling activities; unprotected onlookers should be located 50 feet upwind of drilling or soil sampling activities. In the event that volatile organics are detected in the breathing zone as discussed in Section 3, all personnel within the exclusion zone must don Level C protection. Exclusion zones will also be established during any activity when Level C protection is established as a result of conditions discussed in Section 3.

All personnel within the exclusion zone will be required to use the specified level of protection. No eating, drinking, or smoking will be allowed in the exclusion or decontamination zones.

4.1.2 Decontamination Zone

Should it be necessary to establish an exclusion zone, the decontamination zone will be utilized. This zone will be established between the exclusion zone and the support zone, and will include the personnel and equipment necessary for decontamination of equipment and personnel (discussed below). Personnel and equipment in the exclusion zone must pass through this zone before entering the support zone. This zone should always be located upwind of the exclusion zone.

4.1.3 Support Zone

The support zone will include the remaining areas of the Site. Break areas, operational direction and support facilities (to include supplies, equipment storage and maintenance areas) will be located in this area. No equipment or personnel will be permitted to enter the support zone from the exclusion zone without passing through the personnel or equipment decontamination station. Eating, smoking, and drinking will be allowed only in this area.

4.2 DECONTAMINATION

Due to the low level of contaminants expected, any water used in decontamination procedures will be disposed on-site.

4.2.1 Decontamination of Personnel

Decontamination will not be necessary if only Level D protection is used. However, disposable gloves used during sampling activities should be removed and bagged; personnel should be encouraged to remove clothing and shower as soon as is practicable at the end of the day. All clothing should be machine-washed. All personnel will wash hands and face prior to eating and before and after using the restroom.

Decontamination will be necessary if Level C protection is used. The following OSHA-specified procedures include steps necessary for complete decontamination prior to entry into the support zone, and steps necessary if a worker only needs to change a respirator or respirator canister.

The Site Health and Safety Officer can modify the twelve-station decontamination process, dependent upon the extent of contamination.

Station 1: Segregated Equipment Drop

Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross-contamination.

Station 2: Suit/Safety Boot and Outer-Glove Wash

Thoroughly wash chemically resistant suit, safety boots and outer gloves. Scrub with long-handle, soft-bristle scrub brush and copious amounts of Alconox/water solution.

Necessary equipment includes:

1. Wash tub (30 gallon or large enough for person to stand in)
2. Alconox/water solution
3. Long-handle soft-bristle scrub brushes

Station 3: Suit/Safety Boot and Outer-Glove Rinse

Rinse off Alconox/water solution using copious amounts of water. Repeat as many times as necessary.

Necessary equipment includes:

1. Wash tub (30 gallon or large enough for person to stand in)
2. Spray unit
3. Water
4. Long-handle, soft-bristle scrub brushes

Station 4: Outer Gloves Removal

Remove the outer gloves and deposit in individually marked plastic bags.

Necessary equipment includes:

1. Plastic bag

Station 5: Canister or Mask Change

If a worker leaves the exclusion zone to change a canister (or mask), this is the last step in the decontamination procedures. The worker's canister is exchanged, new outer glove donned, and joints taped. Worker returns to duty. Otherwise the worker proceeds to Station 6.

Necessary equipment includes:

1. Canister (or mask)
2. Tape
3. Gloves

Station 6: Removal of Chemically Resistant Suit

With assistance of helper, remove suit. Deposit in container with plastic liner.

Necessary equipment includes:

1. Container with plastic liner

Station 7: Inner-Glove Wash

Wash inner gloves with Alconox/water solution that will not harm skin. Repeat as many times as necessary.

Necessary equipment includes:

1. Alconox/water solution
2. Wash tub
3. Long-handle, soft-bristle brushes

Station 8: Inner-Glove Rinse

Rinse inner gloves with water. Repeat as many times as necessary.

Necessary equipment includes:

1. Water
2. Wash tub

Station 9: Respirator Removal

Remove face-piece. Avoid touching face. Wash respirator in clean, sanitized solution, allow to dry and deposit face-piece in plastic bag. Store in clean area.

Necessary equipment includes:

1. Plastic bags
2. Sanitizing solution
3. Cotton

Station 10: Inner-Glove Removal

Remove inner gloves and deposit in container with plastic liner.

Necessary equipment includes:

1. Container with plastic liner

Station 11: Field Wash

Wash hands and face.

Necessary equipment includes:

1. Water
2. Soap
3. Tables
4. Wash basins or buckets
5. Clean towels

Station 12: Redress

If re-entering exclusion zone put on clean field clothes (e.g., Tyvek, gloves, etc.).

Necessary equipment includes:

1. Table
2. Clothing

4.2.2 Decontamination of Equipment

Drill rigs will be steam cleaned or pressure washed and other drilling equipment will be decontaminated prior to moving from the Site. Drilling equipment used for multiple boreholes

will be decontaminated prior to drilling each boring at the Site. The equipment will be decontaminated in the following manner:

- The drill rig will be steam cleaned or pressure washed to remove gross contamination.
- Down-hole equipment (auger bits, drill rods, split spoons, etc.) will be steam cleaned or pressure washed and air dried to remove gross contamination.
- Surface equipment, such as field meters and surveying instruments, will be wiped with a clean, damp cloth.

A drilling sequence hierarchy (from less likely to more likely contaminated boring locations) based on existing analytical data will be imposed to reduce the potential for cross contamination.

SECTION 5
SAMPLE SHIPMENT

Samples collected in this study, with the exception of any drum samples, tank samples, or other concentrated wastes, will be classified as environmental samples. In general, environmental samples are collected from streams, ponds, or wells and are not expected to be grossly contaminated with high levels of hazardous materials. Only personnel trained in accordance with 49 CFR126F will be permitted to package, label, handle, or sign manifests for DOT Hazardous Materials.

The sample label will be legibly written and completed with an indelible pencil or waterproof ink. The information will also be recorded in a log book. As a minimum, it will include:

- Exact location of sample
- Time and date sample was collected
- Name of sampler witnesses (if necessary)
- Project codes, sample station number, and identifying code (if applicable).
- Type of sample (if known)
- Laboratory number (if applicable)
- Any other pertinent information
- Chain of custody form

5.1 ENVIRONMENTAL SAMPLES

Environmental samples will be packaged and shipped according to the following procedure:

Packaging

1. Place sample container, properly identified and with a sealed lid, in a polyethylene bag, and seal bag;
2. Place sample in a fiberboard container or plastic cooler which has been lined with a large polyethylene bag.
3. Pack with enough noncombustible, absorbent, cushioning material to minimize the possibility of the container breaking.
4. Seal large bag.
5. Seal or close outside container

Marking/Labeling

Sample containers must have a completed sample identification label and the outside container must be marked "Environmental Sample". The appropriate side of the container must be marked "This End Up" and arrows should be drawn accordingly. No DOT marking labeling is required.

Shipping Papers

No DOT shipping papers are required, but laboratory or chain of custody forms must be signed prior to releasing the package to the carrier.

Transportation

There are no DOT restrictions on mode of transportation.

5.2 HAZARDOUS SAMPLES

Drum samples, tank samples, sludge samples, and grossly contaminated soil samples will be shipped as DOT Hazardous Materials. The designation "Flammable Liquid" or "Flammable Solid" could be used. Refer to International Air Transport Association Guidelines for shipping dangerous goods if the carrier will move the package by air. A completed airway bill must accompany the package and all appropriate labels must be attached to the package.

The samples will be transported as follows:

1. Collect sample in a 16-ounce or smaller glass or polyethylene container with nonmetallic teflon-lined screw cap. Allow sufficient air space (approximately 10% by volume) so container is not liquid full at 54 °C (130 °F). If collecting a solid material, the container plus contents should not exceed 1 pound net weight. If sampling for volatile organic analysis, fill VOA container to septum but place the VOA container inside a 16-ounce or smaller container so the required air space may be provided. Large quantities, up to 3.786 liters (1 gallon), may be collected if the sample's flash point is 23 °C (75 °F) or higher. In this case, the flash point must be marked on the outside container (e.g., carton, cooler), and shipping papers should state that "Flash point is 73 °F or higher."
2. Seal sample and place in a 4-mil-thick polyethylene bag, one sample per bag.
3. Place sealed bag inside a metal jerrican with noncombustible, absorbent cushioning material (e.g., vermiculite or earth) to prevent breakage, one bag per can. Pressure-close the can and use clips, tape or other positive means to hold the lid securely.
4. Mark the can with:

   Name and address of originator

   "Flammable Liquid N.O.S. (name of constituent) UN 1993"

   (or "Flammable Solid N.O.S. (name of constituent) UN 1325)

   NOTE: UN numbers are now required in proper shipping names.

5. Place one or more metal cans in a strong outside container such as an approved plastic cooler or DOT labeled fiberboard box. Preservatives are not used for hazardous waste site samples.

6. Prepare for shipping:

   "Flammable Liquid, N.O.S. (name of constituent) UN 1993" or "Flammable Solid, N.O.S. (name of constituent) UN 1325"; "Cargo Aircraft Only (if more than 1 quart net per outside package); "Limited Quantity" or "Ltd. Qty."; "Laboratory Samples"; "Net Weight ~" or "Net Volume ~" (of hazardous contents) should be indicated on shipping papers and on outside of shipping container. "This Side Up" or "This End Up" should also be on container. Sign shipper certification. Parsons emergency number for shipping dangerous good: Chem-Tel (800) 255-3924.

7. Stand by for possible carrier requests to open outside containers for inspection or modify packaging. It is wise to contact carrier before packing to ascertain local packaging requirements and not to leave area before the carrier vehicle (aircraft, truck) is on its way.

5.3 SHIPPING PAPERS

A blank shipping paper should be filled out and maintained within the driver's reach, whenever an employee carries hazardous materials in a vehicle in quantities above those allowed for Materials of Trade (MOTs). Such materials may include more than 8 gallons of the following:

- Gasoline (for use in a generator) UN1203, Guide #27
- Methanol (for possible use in decontamination procedures) UN 1230, Guide #28
- Nitric Acid (for possible use in decontamination procedures) UN 1760, Guide #60
- Hydrochloric Acid (for possible use in decontamination procedures) UN 1789, Guide #60

Other materials may include the following:

- > 220 pounds of compressed Gas [Air, Compressed] (calibration gas for the PID, or Grade D breathing air for Level B work) UN 1002, Class 2.2.
- Other hazardous materials as defined by the DOT.

Appropriate MSDSs should be maintained with the shipping papers and/or the pocket DOT Emergency Response Guidebook.

SECTION 6
ACCIDENT PREVENTION AND CONTINGENCY PLAN

6.1 ACCIDENT PREVENTION

All field personnel will receive health and safety training prior to the initiation of any site activities. On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before daily work assignments, regular meetings should be held. Discussion should include:

- Tasks to be performed.
- Time constraints (e.g., rest breaks, cartridge changes).
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals.
- Emergency procedures.

6.1.1 Drilling

Prior to any drilling activity efforts will be made to determine whether underground installations will be encountered and, if so, where these installations are located. Follow the Drilling Protocol and checklist in Attachment 5. Hard hats, safety glasses, and safety boots must as a minimum be worn within 50 feet of the drill rig. The drill rig cannot be operated within 10 feet of power lines. The Field Team Leader or Site Health and Safety Officer will provide constant on-site supervision of the drilling subcontractor to ensure that they are meeting the health and safety requirements. If deficiencies are noted, work will be stopped and corrective action will be taken (e.g., retrain, purchase additional safety equipment). Reports of health and safety deficiencies and the corrective action taken will be forwarded to the Project Manager.

6.1.2 Vehicles and Heavy Equipment

Working with large motor vehicles and heavy equipment could be a major hazard at this site. Injuries can result from equipment hitting or running over personnel, impacts from flying objects, or overturning of vehicles. Vehicle and heavy equipment design and operation will be in accordance with 29 CFR, Subpart O, 1926.600 through 1926.602. In particular, the following precautions will be utilized to help prevent injuries/accidents.

- Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices will be checked at the beginning of each shift.
- Large construction motor vehicles will not be backed up unless:
  - The vehicle has a reverse signal alarm audible above the surrounding noise level; or
  - The vehicle is backed up only when an observer signals that it is safe to do so.

- Heavy equipment or motor vehicle cable will be kept free of all nonessential items, and all loose items will be secured.
- Large construction motor vehicles and heavy equipment will be provided with necessary safety equipment (seat belts, roll-over protection, emergency shut-off in case of roll-over, backup warning lights and audible alarms.)
- Blades and buckets will be lowered to the ground and parking brakes will be set before shutting off any heavy equipment or vehicles.

6.2 CONTINGENCY PLAN

6.2.1 Emergency Procedures

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on site.
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

General emergency procedures, and specific procedures for personal injury and chemical exposure, are described below.

6.2.2 Chemical Exposure

If a member of the field crew demonstrates symptoms of chemical exposure the procedures outlined below should be followed:

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should communicate to the Field Team Leader (via voice and hand signals) of the chemical exposure. The Field Team Leader should contact the appropriate emergency response agency.
- Precautions should be taken to avoid exposure of other individuals to the chemical.
- If the chemical is on the individual's clothing, the chemical should be neutralized or removed if it is safe to do so.
- If the chemical has contacted the skin, the skin should be washed with copious amounts of water.
- In case of eye contact, an emergency eye wash should be used. Eyes should be washed for at least 15 minutes.
- All chemical exposure incidents must be reported within 2 hours to the client contact, Office Health and Safety Officer and the Project Manager. A written report must be prepared and submitted within 24 hours. The Site Health and Safety Officer or Field Team Leader is responsible for completing the accident report (See Attachment 6).

6.2.3 Personal Injury

In case of personal injury at the site, the following procedures should be followed:

- Another team member (buddy) should signal the Field Team Leader that an injury has occurred.
- A field team member trained in first aid can administer treatment to an injured worker.
- The victim should then be transported to the nearest hospital or medical center. If necessary, an ambulance should be called to transport the victim.
- For less severe cases, the individual can be taken to the site dispensary.
- All incidents must be reported within 2 hours to the client contact, Office Health and Safety Officer and the Project Manager. A written report must be prepared and submitted within 24 hours. The Site Health and Safety Officer or Field Team Leader is responsible for completing the accident report (See Attachment 6).

6.2.4 Evacuation Procedures

- The Field Team Leader will initiate evacuation procedure by signaling to leave the Site.
- All personnel in the work area should evacuate the area and meet in the common designated area.
- All personnel suspected to be in or near the contract work area should be accounted for and the whereabouts of missing persons determined immediately.
- Further instruction will then be given by the Field Team Leader.

6.2.5 Procedures Implemented in the Event of a Major Fire, Explosion, Near Misses, or On-Site Health Emergency Crisis

- Notify the paramedics and/or fire department, as necessary;
- Signal the evacuation procedure previously outlined and implement the entire procedure;
- Isolate the area;
- Stay upwind of any fire;
- Keep the area surrounding the problem source clear after the incident occurs;
- All chemical exposure incidents must be reported within 2 hours to the client contact, Office Health and Safety Officer and the Project Manager. A written report must be prepared and submitted within 24 hours. The Site Health and Safety Officer or Field Team Leader is responsible for completing the accident report (See Attachment 6).

6.2.6 Community Air Monitoring Plan

Real-time air monitoring for volatile compounds and arsenic at the perimeter of the exclusion zone is necessary. Contaminants on site are not anticipated to become airborne because of the high moisture content of the soil. Proactive wetting down of site soils should

prevent the off-site emission of dusts from investigation activities. However, if dust becomes a concern at this site, possibly during future construction activities, this Community Air Monitoring Plan will be modified accordingly. All readings must be recorded and be available for USEPA and State (NJDEP) personnel to review. No objectionable odor should be detected at the site perimeter.

Volatile organic compounds must be monitored at the downwind perimeter of the exclusion zone daily at 2-hour intervals during intrusive activities. If the level of volatile organic compounds is more than 1 ppm. (Option: If Benzene (using detector tubes) is less than 0.5 ppm then an action level of more than 10 ppm may be used.), then drilling or intrusive activities must be halted and monitoring continued under the provisions of the Vapor Emission Response Plan (see below).

Airborne dust will be monitored at the Site. The nuisance particulate permissible exposure limit (PEL) for respirable dust required by OSHA is 5 mg/m^3. Therefore, the formula below is used to determine which chemicals need to be monitored using real-time aresol mass monitoring or ambient monitoring when working at the site.

$$EL_{mix} = \frac{(10^6\ mg/kg) \times (EL\ mg/m^3)}{(conc.\ mg/kg) \times (Safety\ Factor)}$$

Where:

- EL_{mix} : Air concnetreation of total dust at which the contaminats of concern would be at their established exposure point.
- EL: Exposure limit of the chemical (e.g., ACGIH TLV, in mg/m^3)
- 10^6: Conversion Factor
- Conc.: Soil concentration of the chemical (in mg/kg).
- Safety Factor: A number between 1 and 10 is used to account for the degree of confidence you have in your concentration information. The lower the number used, the more confidence the evaluator has in how well the data represents site conditions.

When inserting the EL and concentration for arsenic found in the soil into the formula above, EL_{mix} was observed below 5 mg/m^3. Using the formula on arsenic will generate the following action level for total dust:

$$EL_{mix}Arsenic = \frac{(10^6 \text{ mg/kg}) \times (0.01 \text{ mg/m}^3)}{(3{,}370 \text{ mg/kg}) \times (2)} = 1.48 \text{ mg/m}^3$$

Since arsenic is the contaminant with the greatest concern due to its concntration in the soil, the EL_{mix} = 1.48 mg/m^3 will be the limiting factor when determining an action level for total dust. By controlling dust levels below this value through actions such as wetting down of site soils during open excavation work, overexposure to all chemicals will be avoided. DataRAM real-time aersol mass monitors or equivalent will be used along the perimeter of the site to monitor total dust levels, as well as point source monitoring upwind and downwind of intrusive activities.

In addition to the perimeter and point source monitoring mentioned above, personal air sampling for total dust, respirable dust and arsenic will occur simultaneously to determine the amount of arsenic that is present in the repirable dust. If the amount of arsenic present compared to the respirable dust present indicates that the exposure to arsenic is higher than anticipated, then the action level for dust described above will be decreased accordingly.

6.2.7 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 10 (or 0.5 ppm benzene) ppm above background (for a 2 minute sustained period) at the perimeter of the Exclusion Zone, activities will be halted and monitoring continued. If the organic vapor level decreases below 10 ppm VOC (or 0. 5 ppm Benzene) above background, activities can resume. If the organic vapor (VOC) levels are greater than 10 ppm over background but less than 50 ppm over background at the perimeter of the Exclusion Zone, activities may also resume provided:

- The VOC level 200 ft. downwind of the Exclusion Zone or half the distance to the nearest off-site receptor, whichever is less, is below 1 ppm over background (organic vapor)
- More frequent intervals of monitoring are conducted.
  - No objectionable odor at site perimeter.

If the organic vapor level is above 5 ppm at the perimeter of the Exclusion Zone work activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest receptor at levels exceeding those specified in the Major Vapor Emission section.

6.2.8 Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the Survey Site or half the distance to the nearest receptor, whichever is less, all work activities must be halted.

If organic levels then persist above 5 ppm above background 200 feet downwind or half the distance to the nearest receptor from the Exclusion Zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest receptor (20-Foot Zone).

If either of the following criteria are exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented:

- Organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes.
- Organic vapor levels greater than 10 ppm above background for any time period.

6.2.9 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. If emissions are going beyond the fence line including odors, the incident must be reported as a release and NJDEP notified (877-WARNDEP) and they will notify other local agencies.
2. Frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.
3. All other emergency contacts will be notified as appropriate.

6.2.10 Communication

Communication either via radio or cellular phone will be maintained between the field office and all work parties. In case of emergency or accident the field emergency response person will immediately notify the field office via the communication equipment.

Field team members will use the *buddy* system while performing field activities. Buddies will pre-arrange hand signals for communication. The following hand signals are suggested:

- **Hand gripping throat**: out of air, cannot breathe.
- **Grip partner's wrist or place both arms straight up overhead**: Leave area immediately, no debate.
- **Place both arms overhead in form of an "X"**: Need assistance.
- **Thumbs up**: OK, I am all right; or I understand.
- **Thumbs down**: No or negative.

ATTACHMENT 1
HEALTH AND SAFETY PLAN
AIR MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE

AIR MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE

All monitoring instruments must be calibrated and maintained periodically. The limitations and possible sources of errors for each instrument must be understood by the operator. It is important that the operator ensures that the instrument responds properly to the substances that it was designed to monitor. Portable air quality monitoring equipment that measures total ionizables present, such as the Photovac MicroTIP HL-2000, must be calibrated at least once each day. Combustible gas/oxygen/%LEL meters (explosimeters) such as the MSA Model 360, must be calibrated at least once each week. Real time aerosol monitors, such as the MINI-RAM, must be zeroed at the beginning of each sampling period. The specific instructions for calibration and maintenance provided for each instrument should be followed.

ATTACHMENT 2
HEALTH AND SAFETY PLAN
FORMS FOR HEALTH AND SAFETY-RELATED ACTIVITIES

Note: The OSHA Job Safety and Health Protection Poster must be posted prominently during field activities. The following page is an example of the poster to be used in the field. The actual poster must be an 11 inch by 17 inch size version of this page.

ACCIDENT REPORT FORM

DO NOT USE THIS FORM UNLESS TOLD TO DO SO. USE HONEYWELL FORM.

Project Name:_____

INJURED OR ILL EMPLOYEE

1. Name _____ Social Security #_____
   (First) (Middle) (Last)
2. Home Address _____
   (No. and Street) (City or Town) (State and Zip)
3. Age _____ 4. Sex: Male ( ) Female ( )
5. Occupation _____
   (Specific job title, not the specific activity employee was performing at time of injury)
6. Department _____
   (Enter name of department in which injured person is employed, even though they may have been temporarily working in another department at the time of injury)

EMPLOYER

7. Name _____
8. Mailing Address _____
   (No. and Street) (City or Town) (State and Zip)
9. Location (if different from mailing address):_____
   _____

THE ACCIDENT OR EXPOSURE TO OCCUPATIONAL ILLNESS

10. Place of accident or exposure _____
    (No. and Street) (City or Town) (State and Zip)
11. Was place of accident or exposure on employer's premises? _(Yes/No)
12. What was the employee doing when injured?_____
    _____
    (Be specific - was employee using tools or equipment or handling material?)
    _____
13. How did the accident occur? _____
    (Describe fully the events that resulted in the injury or
    _____
    occupational illness. Tell what happened and how. Name objects and
    _____
    substances involved. Give details on all factors that led to accident. Use separate sheet if needed)

ACCIDENT REPORT FORM

DO NOT USE THIS FORM UNLESS TOLD TO DO SO. USE HONEYWELL FORM.

14. Time of accident: _____

15. Date of injury or initial diagnosis of occupational illness _____
(Date)

16. WITNESS TO ACCIDENT

(Name)	(Affiliation)	(Phone No.)
(Name)	(Affiliation)	(Phone No.)
(Name)	(Affiliation)	(Phone No.)

OCCUPATIONAL INJURY OR OCCUPATIONAL ILLNESS

17. Describe the injury or illness in detail; indicate part of body affected.

_____

_____

18. Name the object or substance which directly injured the employee. (For example, object that struck employee; the vapor or poison inhaled or swallowed; the chemical or radiation that irritated the skin; or in cases of strains, hernias, etc., the object the employee was lifting, pulling, etc.)

_____

_____

19. Did the accident result in employee fatality? _____ (Yes or No)

20. Number of lost workdays ____/restricted workdays _____ resulting from injury or illness?

OTHER

21. Did you see a physician for treatment? _____ (Yes or No) _____ (Date)

22. Name and address of physician _____

_____
(No. and Street) (City or Town) (State and Zip)

23. If hospitalized, name and address of hospital _____

_____
(No. and Street) (City or Town) (State and Zip)

Date of report _____ Prepared by _____

Official position _____

PROJECT HEALTH AND SAFETY PLAN AND WORK PLAN ACCEPTANCE FORM

(For Parsons employees only)

I have read and agree to abide by the contents of the Work Plan and Health and Safety Plan for the following project:

_____ _____

(Project Title) (Project Number)

Furthermore, I have read and am familiar with the work plan or proposal which describes the field work to be conducted and the procedures to be utilized in the conduct of this work.

Name (print)	Signature	Date

Place in project Health and Safety File as soon as possible

SITE-SPECIFIC HEALTH AND SAFETY TRAINING

(For All Parsons and subcontract employees on the Site)

I hereby confirm that site-specific health and safety training has been conducted by the Site Health and Safety Officer which included:

- Names of personnel responsible for site safety and health
- Safety, health, and other hazards at the Site
- Proper use of personal protective equipment
- Work practices by which the employee can minimize risk from hazards
- Safe use of engineering controls and equipment on the Site
- Acute effects of compounds at the Site
- Decontamination procedures

For the following project:

_____	_____
(Project Title)	(Project Number)

Name (print)	Signature	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Place in project Health and Safety File as soon as possible

ATTACHMENT 3
HEALTH AND SAFETY PLAN
MATERIAL SAFETY DATA SHEETS

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 202-483-7616

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ARSENIC TRIOXIDE

MSDS Number: A7512 --- *Effective Date: 09/08/97*

1. Product Identification

Synonyms: Arsenic (III) oxide; arsenic sesquioxide; arsenous trioxide, white arsenic
CAS No.: 1327-53-3
Molecular Weight: 197.84
Chemical Formula: As2O3
Produet Codes: 0061

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Arsenic Trioxide	1327-53-3	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CANCER HAZARD. CONTAINS INORGANIC ARSENIC WHICH CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE LIVER AND KIDNEY DAMAGE. USE ONLY WITH ADEQUATE VENTILATION AND RESPIRATORY EQUIPMENT.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Cancer Causing)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Arsenic may cause inflammation of the mucous membranes with cough and foamy sputum, restlessness, dyspnea, cyanosis, and rales. Symptoms like those from ingestion exposure may follow. May cause pulmonary edema.

Ingestion:

Arsenic is highly toxic! May cause burning in esophagus, vomiting, and bloody diarrhea. Symptoms of cold and clammy skin, low blood pressure, weakness, headache, cramps, convulsions, and coma may follow. May cause damage to liver and kidneys. A suspected fetal toxin. Death may occur from circulatory failure. Estimated lethal dose 120 milligrams.

Skin Contact:

May cause irritation, symptoms including redness, itching, and pain.

Eye Contact:

May cause irritation with itching, burning, watering of eyes; may cause conjunctiva damage.

Chronic Exposure:

Arsenic on repeated or prolonged skin contact may cause bronzing of the skin, edema, dermatitis, and lesions. Repeated or prolonged inhalation of dust may cause damage to the nasal septum. Chronic exposure from inhalation or ingestion may cause hair and weight loss, a garlic odor to the breath and perspiration, excessive salivation and perspiration, central nervous system damage, hepatitis, gastrointestinal disturbances, cardiovascular damage, and kidney and liver damage. Arsenic compounds are known human carcinogens and may be teratogenic based on effects in laboratory animals.

Aggravation of Pre-existing Conditions:

No information found.

---

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse. Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to this substance.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

If emesis if unsuccessful after two doses of Ipecac, consider gastric lavage. Monitor urine arsenic level. Alkalization of urine may help prevent disposition of red cell breakdown products in renal tubular cells. If acute exposure is significant, maintain high urine output and monitor volume status, preferably with central venous pressure line. Abdominal X-rays should be done routinely for all ingestions. Chelation therapy with BAL, followed by n-penicillamine is recommended, but specific dosing guidelines are not clearly established.

---

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard. Toxic fumes of arsenic trioxide and arsine may be formed in fire situations.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

OSHA Permissible Exposure Limit (PEL): 10 ug(As)/m3 ppm (TWA)
ACGIH Threshold Limit Value (TLV): 0.01 mg(As)/m3 (TWA), listed as A1, confirmed human carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face high efficiency dust/mist respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:

Any area where inorganic arsenic is stored, handled, used, etc., must be established as a 'Regulated Area' with controlled access, limited to authorized persons. Containers of inorganic arsenic and Regulated Areas must be labeled to show a CANCER SUSPECT AGENT is present. Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing arsenic or lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (arsenic: 29 CFR 1910 .1018; lead: 29 CFR 1910.1025).

---

9. Physical and Chemical Properties

Appearance:

Transparent crystals, or white powder.

Odor:

Odorless.

Solubility:

3.7 g/100 ml water @ 20C (68F)

Specific Gravity:

3.74

pH:

No information found.

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

465C (869F)

Melting Point:

315C (599F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

No information found.

Evaporation Rate (BuAc=1):

No information found.

---

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Emits toxic fumes of arsenic when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Oxidizers, tannic acid, infusion cinchona and other vegetable astringent infusions and decoctions, iron solutions, rubidium carbide, chlorine trifluoride, fluorine, hydrogen fluoride, oxygen difluoride, acids, bases, sodium chlorate, zinc filings, other reactive metals and mercury. Corrosive to metals in the presence of moisture.

Conditions to Avoid:

Incompatibles.

11. Toxicological Information

Toxicological Data:

Oral rat LD50: 14.6 mg/kg; investigated as a mutagen, tumorigen, reproductive effector.

Reproductive Toxicity:

Has shown teratogenic effects in laboratory animals.

	NTP Carcinogen		
Ingredient	**Known**	**Anticipated**	**IARC Categor**
Arsenic Trioxide (1327-53-3)	Yes	No	1

12. Ecological Information

Environmental Fate:

When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may biodegrade to a moderate extent. This material is not expected to significantly bioaccumulate.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, ARSENIC TRIOXIDE
Hazard Class: 6.1
UN/NA: UN1561
Packing Group: II
Information reported for product/size: 500G

International (Water, I.M.O.)

Proper Shipping Name: ARSENIC TRIOXIDE
Hazard Class: 6.1
UN/NA: UN1561
Packing Group: II
Information reported for product/size: 500G

International (Air, I.C.A.O.)

Proper Shipping Name: ARSENIC TRIOXIDE
Hazard Class: 6.1
UN/NA: UN1561
Packing Group: II
Information reported for product/size: 500G

15. Regulatory Information

Ingredient	TSCA	EC	Japan	Austrailia
Arsenic Trioxide (1327-53-3)	Yes	Yes	Yes	Yes

Ingredient	Korea	DSL	NDSL	Phil
Arsenic Trioxide (1327-53-3)	Yes	Yes	No	Yes

	SARA 302		SARA 313	
Ingredient	RQ	TPQ	List	Chemical Cat
Arsenic Trioxide (1327-53-3)	1	100*	No	Arsenic Comp

		RCRA	TSCA
Ingredient	**CERCLA**	**261.33**	**8(d)**
Arsenic Trioxide (1327-53-3)	Yes	No	No

Chemical Weapons Convention: No
TSCA 12(b): No
CDTA: No
SARA 311/312:
Acute: Yes
Chronic: Yes
Fire: No
Pressure: No
Reactivity: No
(Pure / Solid)

WARNING:
THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 2Z
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: 3 Flammability: 0 Reactivity: 0

Label Hazard Warning:

DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CANCER HAZARD. CONTAINS INORGANIC ARSENIC WHICH CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE LIVER AND KIDNEY DAMAGE. USE ONLY WITH ADEQUATE VENTILATION AND RESPIRATORY EQUIPMENT.

Label Precautions:

Do not get in eyes, on skin, or on clothing.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

Disclaimer:

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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

MATERIAL SAFETY DATA SHEET

Manufacturer:
S.T.A.R., INC.
1400 Walcutt Road
Columbus, OH 43228

Emergency Phone No. **CHEM-TEL 800-255-3924**
Information Phone No. 800-759-1912
Date Of Preparation July 18, 1996
Date Supersedes April 19, 1994

SECTION I- IDENTIFICATION

Product Name: STAR SEAL - ASPHALT PAVEMENT SEALER

Chemical Family - Refined Coal Tar Pitch Emulsion
Chemical Name - Proprietary.
Prepared by - G.C. Dubey

H.M.I.S
Health = 1
Fire = 1
Reactivity = 1

SECTION II- INGREDIENTS

Ingredients	CAS NO.	WT%	Exposure Limits OSHA PEL	Exposure Limits ACGIH TLV
Hazardous Ingredients				
Coal Tar Pitch	65996-93-2	29-32	0.2 mg/m3 (Volatiles)	0.2 mg/m3 (Volatiles)
Listed in SARA Title III, Section 313- No.				
STEL	- N/A*			
LC 50	- N/A			
LD 50	- N/A			
Other Ingredients				
Clay	1332-58-7	18-20	N/A	10mg/m3 (dust)
STEL	- 5 MG/M3 (DUST)			
LC 50	- N/A			
LD 50	- N/A			
Water	7732-18-5	48-50	N/A	N/A
Listed in SARA Title III, Section 313 - No.				
STEL	- N/A			
LC 50	- N/A			
LD 50	- CTI OVER 320,000			

* N/A = NOT AVAILABLE OR APPLICABLE

Total weight percentage of all the listed ingredients could be below 100, indicating other unlisted ingredients that are not considered hazardous by any federal (OSHA, WHMIS, SARA), any state or province or local Right-To-Know Regulations.

Unusual Chronic Toxicity: May cause cancer of the skin, lungs, kidney and bladder. Prolonged or repeated contact over many years in the absence of good hygiene and personal protection may lead to changes in skin pigmentation and skin tumors.

Conditions aggravated by exposure and additional health hazards: The test results reported in Koppers Industries, Inc. publication "Using refined Coal tar Emulsion safely-1991"conclusively established that emissions during the manufacturing as well as application of sealcoatings based on refined coal tar are well below the OSHA exposure limits. Refined coal tar is a complex mixture of thousands of chemical compounds, majority being closed ring, polynuclear aromatic compounds (PNAs) which range from single ring structure to multiple (30-40) rings in their molecular structure. According to NTP, IARC or OSHA, some of these PNAs have been found to induce cancer in animals under laboratory conditions.

Cancer warning statements for materials derived from coke oven tar-which includes refined coal tar (RT-12)-are based primarily on crude (unrefined tars). No data has been established on refined coal tars or sealcoatings based on refined coal tars as potential carcinogens. The cancer warnings are, therefore, affixed on all the coal tar derived products due to the lack of specific data on these products.

Respirable crystalline silica, also used in conjunction with this product is a suspected carcinogen, however, no exposure is expected through the use of this material. This product and sealcoatings, in general, have not been tested for chronic exposure effects.

Carcinogenic: IARC- YES ACGIH- YES

EMERGENCY FIRST AID PROCEDURES

Eyes- Immediately flush with plenty of water for 15 minutes, call a physician, if condition persists.
Skin- Wash thoroughly with plenty of water and soap. If irritation persists, seek medical help.
Inhalation- Move to fresh air. If breathing has stopped or is difficult, administer artificial respiration oxygen as needed. Seek medical help.
Ingestion- Do not induce vomiting. Give 1-2 glasses of milk. Do not attempt to give anything by mouth to an unconscious person. Seek medical help immediately and show M.S.D.S. or label.

SECTION VI- REACTIVITY DATA

Stability	Conditions to Avoid	Incompatibility
Stable	Keep from freezing.	(Materials to avoid) Strong oxidizing agents.

Hazardous Decomposition Products - N/A
Hazardous Polymerization - Will not occur.
Conditions to Avoid - N/A

SECTION VII- SPILL OR LEAK PROCEDURES

SARA Title III
302 - No # 304 -No # 313 - No. RCRA-No.

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Ventilate the area. Wear approved respiratory protection. Wear suitable protective clothing, gloves and eye / face protection. Contain and pick up waste material. Put in a sealed approved container. Dispose of in accordance with federal, state, and local regulations.
For Small Spills: Absorb with an inert material and place in containers.
For Large Spills: Contain material and pump into tanks or other suitable containers. Spills over 45 gallons should be reported to national, state and local emergency response agencies. The telephone number for the National Response Center is 800-424-8802.

Do not flush into sewers or bodies of water. The material will suffocate fish until it settles to bottom.

WASTE DISPOSAL

This material is not a hazardous waste in either liquid (emulsion) form or as dried material, according to TCLP (Toxic Characteristic Leaching Procedure) results (EPA method 1311). Recommended disposal by land filling (dry) or incineration shall be selected in accordance with the local, state and federal regulations.

Reportable Quantity -	N/A
Regulations -	WHMIS, SARA, State and province.
Hazardous Waste -	N/A
TPQ (lb.) -	N/A

SECTION VIII- SAFE HANDLING AND PROTECTION INFORMATION

Ventilation: Use local exhaust ventilation to control mists or vapors generated when using this product.
Special - N/A Other - N/A
Respiratory Protection: Use only with adequate ventilation. If ventilation is inadequate, wear approved respiratory equipment.
Protective Gloves: Rubber Gloves, chemically resistant.
Eye Protection: Wear safety glasses, goggles or face shield.
Other Protective Equipment: Wear suitable protective clothing.

Estimated LD50, MG/KG:	N/A
Estimated LC50, PPM:	N/A
Sensitization:	N/A
Irritants:	YES

SECTION IX- SPECIAL PRECAUTIONS

1. Keep out of reach of children.
2. For professional and industrial use only.
3. Do not handle until manufacturer's safety precautions have been read and understood.
4. Use only with adequate ventilation.
5. Do not take internally.
6. Avoid contact with eyes and skin.
7. Wash thoroughly after using. Practice safe hygiene principles.
8. Additional Technical Data Sheets and/or M.S.D.S.'s are available upon request.

MSDS for BENZENE

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: BENZENE
FORMULA: C6H6
FORMULA WT: 78.10
CAS NO.: 71-43-2
NIOSH/RTECS NO.: CY1400000
COMMON SYNONYMS: BENZOL; PHENYL HYDRIDE; COAL NAPHTHA
PRODUCT CODES: 9156,9256,9153,9154,9155,B717,9149
EFFECTIVE: 01/22/87
REVISION #04

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM
HEALTH - 4 EXTREME (CANCER CAUSING)
FLAMMABILITY - 3 SEVERE (FLAMMABLE)
REACTIVITY - 0 NONE
CONTACT - 1 SLIGHT
HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT
GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS
POISON DANGER
EXTREMELY FLAMMABLE
CAUTION: CONTAINS BENZENE, CANCER HAZARD
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN
EXCEPTIONAL HEALTH HAZARD - READ MATERIAL SAFETY DATA SHEET

KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE ALCOHOL FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE. FLUSH SPILL AREA WITH WATER SPRAY.

SAF-T-DATA(TM) STORAGE COLOR CODE: RED STRIPE (STORE SEPARATELY)

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2 - HAZARDOUS COMPONENTS

COMPONENT % CAS NO.
BENZENE 90-100 71-43-2

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3 - PHYSICAL DATA

BOILING POINT: 80 C (176 F) VAPOR PRESSURE(MM HG): 74.6
MELTING POINT: 6 C (43 F) VAPOR DENSITY(AIR=1): 2.77
SPECIFIC GRAVITY: 0.88 EVAPORATION RATE: N/A
(H2O=1) (BUTYL ACETATE=1)
SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 100
APPEARANCE & ODOR: CLEAR COLORLESS LIQUID HAVING CHARACTERISTIC AROMATIC ODOR.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP: -11 C (12 F) NFPA 704M RATING: 2-3-0
FLAMMABLE LIMITS: UPPER - 8.0 % LOWER - 1.3 %

FIRE EXTINGUISHING MEDIA
USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED
CARBON MONOXIDE, CARBON DIOXIDE

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5 - HEALTH HAZARD DATA

THIS SUBSTANCE IS LISTED AS ACGIH SUSPECT HUMAN CARCINOGEN, NTP HUMAN CARCINOGEN, IARC HUMAN CARCINOGEN (GROUP 1). ACCEPTABLE MAXIMUM PEAK ABOVE THE ACCEPTANCE CEILING CONCENTRATION FOR AN EIGHT-HOUR SHIFT = 50 PPM FOR 10 MINUTES; (PEL) CEILING = 25 PPM.

THRESHOLD LIMIT VALUE (TLV/TWA): 30 MG/M3 (10 PPM)
SHORT-TERM EXPOSURE LIMIT (STEL): 75 MG/M3 (25 PPM)
PERMISSIBLE EXPOSURE LIMIT (PEL): 30 MG/M3 (10 PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 4894
LD50 (ORAL-MOUSE)(MG/KG) - 4700
LD50 (IPR-RAT)(MG/KG) - 2.9
LC50 (INHL-MOUSE-7H) (PPM) - 9980

CARCINOGENICITY: NTP: YES IARC: YES Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, SUFFOCATION,

LOWER BLOOD PRESSURE, CENTRAL NERVOUS SYSTEM DEPRESSION.
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OR BURNS OF THE RESPIRATORY SYSTEM, PULMONARY EDEMA, OR LUNG INFLAMMATION.
LIQUID MAY BE IRRITATING TO SKIN AND EYES. PROLONGED SKIN CONTACT MAY RESULT IN DERMATITIS. EYE CONTACT MAY RESULT IN TEMPORARY CORNEAL DAMAGE.
INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTRO-INTESTINAL IRRITATION, BLURRED VISION, LOWERING OF BLOOD PRESSURE.
IRREVERSIBLE INJURY TO BLOOD FORMING TISSUE MAY RESULT FROM CHRONIC LOW LEVEL EXPOSURE.

TARGET ORGANS
BLOOD, CENTRAL NERVOUS SYSTEM, EYES, SKIN, BONE MARROW, RESPIRATORY SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INGESTION, INHALATION, EYE CONTACT, SKIN CONTACT, ABSORPTION

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, SULFURIC ACID, NITRIC ACID

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U019 (TOXIC WASTE)

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8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 10 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, POLYVINYL ALCOHOL GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED STRIPE (STORE SEPARATELY)

SPECIAL PRECAUTIONS
BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)
PROPER SHIPPING NAME BENZENE (BENZOL)
HAZARD CLASS FLAMMABLE LIQUID
UN/NA UN1114
LABELS FLAMMABLE LIQUID
REPORTABLE QUANTITY 1000 LBS.
INTERNATIONAL (I.M.O.)
PROPER SHIPPING NAME BENZENE
HAZARD CLASS 3.2
UN/NA UN1114
LABELS FLAMMABLE LIQUID

MATERIAL SAFETY DATA SHEET FOR LEAD ANCHORS

Manufacturer:	Powers Fasteners, Inc.
Address:	2 Powers Square New Rochelle, NY 10801
Phone:	(914) 235-6300
Contact:	Customer Service Department
Emergency Contact:	CHEMTREC
Emergency Phone Number:	800-424-9300
Product Name:	2% - 4% Antimonial Lead Used In Anchors Calk-In (anchor sleeve), Fiberplug (liner), Scru-Lead (anchor body)

Section I - Product Identification

Product Name:	2% - 4% Antimonial Lead
UN Numbers:	Not applicable.
Chemical Family:	Not applicable.
Synonyms:	Lead Shields

Section II - Hazardous Ingredients

Components	% Contents	CAS Number	ACGIH TLV	OSHA PEL
Lead	96.0 - 98.0	7439-92-1	0.15 mg/m^3	TWA : 0.05 mg/m^3
Antimony	2.0 - 4.0	7440-36-0	0.5 mg/m^3	TWA : 0.5 mg/m^3
Arsenic	0.001 - 0.01	7440-38-2	-	TWA : 0.01 mg/m^3

The UN Number is the United Nations classification and the % Contents listed is an average by weight. CAS Numbers are assigned by Chemical Abstract Services. ACGIH TLV is the Threshhold Limit Value established by the American Conference of Governmental Industrial Hygienist. OSHA PEL is the Permissible Exposure Limit established by the Occupational Safety and Health Administration. TWA signifies a Time Weighted Average.

Section III - Physical Data

Appearance:	Dark Gray
Odor:	None
Boiling Point:	2,516° F.
Melting Point	486° - 680° F.
Vapor Pressure:	Not volatile.
Vapor Density:	Not volatile.
Evaporation Rate:	Not applicable.
Solubility (H_2O):	Nil
Specific Gravity:	11.37 (in water at 39.2° F.)

Section IV - Fire and Explosion Data

Flash Point:	Not flammable.
Flammability Limits:	Not applicable.
Flammability Class:	Not applicable.
Extinguishing Agent:	Not applicable.
Fire and Explosion Hazards:	Not applicable.
Special Fire Fighting Procedures:	If metal is present where there is fire, wear NIOSH / MSA Self-Contained Breathing Apparatus and full protective gear, in case of lead fumes.

Section V - Exposure and Effects

Exposure Effects:

Inhalation:	Dust or fumes may be irritating to the respiratory system.
Skin Contact:	Not a route of entry into the body.
Eye Contact:	Dust or fumes may cause irritation.
Ingestion:	Antimony may be toxic, dust and fumes may cause nasal septum ulceration and stomach lining irritation. Lead dust or fumes may be toxic and cumulative, affecting the kidneys and nervous system. Symptoms may include anemia, insomnia, weakness, irritability constipation and stomach pains.
Skin Absorption:	Not a route of entry into the body.

First Aid:

Inhalation:	Remove to fresh air. Consult a physician.
Skin Contact:	Wash thoroughly with soap and water.
Eye Contact:	Flush thoroughly with water. Consult a physician.
Ingestion:	Induce vomiting if person is conscious. Consult a physician.
Note to Physician:	Check for the effects of antimony.

Section VI - Reactivity Data

Stability:	Stable
Incompatible Materials:	Not applicable.
Hazardous Decomposition Products:	Lead fumes and antimony oxides at high temperatures (above 750°F.).
Hazardous Polymerization:	Will not occur.
Other Conditions to Avoid:	Not applicable.

Section VII - Spill, Leak or Disposal Procedures

Steps to be Taken in the Event of Spills, Leaks or Release:
Allow to solidify, collect and place in a sealed drum.

Waste Disposal Method:
Dispose of in accordance with Federal, State and Local Environmental Regulations

Section VIII - Special Protective Measures

Ventilation:	Mechanical or natural exhaust is recommended.
Eye Protection:	Wear safety glasses / goggles meeting ANSI requirements and other appropriate protection.
Hearing Protection:	Not applicable.
Skin Protection:	Wear protective gloves and other appropriate protection.
Respiratory Protection:	If fumes or dust are present, wear NIOSH / MSA Self-Contained Breathing Apparatus and full protective gear.

Section IX - Special Precautions

Storage:	Store metal in a clean, dry area away from heat and chemicals that might react with the material.
Waste Disposal Method:	Dispose of in accordance with Federal, State and Local Environmental Regulations.
Other Precautions:	Eating, drinking and smoking should be prohibited in areas where lead and antimony are procesed.

Section X - Other Regulatory Information

Hazardous Materials Identification System (HMIS) Codes :

The following information is supplied based on the Hazardous Materials Identification System (HMIS) established by the National Paint and Coatings Associations.

Health:	2
Fire:	0
Reactivity:	0

California Proposition 65 Warning :

This product contains lead, a chemical known to the State of California to cause cancer, birth defects and other reproductive harm.

Section XII - Shipping Information

DOT Proper Shipping Name:	Not regulated by DOT
ICAO / IATA Proper Shipping Name:	Not regulated by ICAO / IATA

Date of Preparation: Revised February 12, 2003

For additional copies of this MSDS, go to www.powers.com and select MSDS.

MATERIAL SAFETY DATA SHEET
CHROMIUM TRIOXIDE

ELEMENTIS
CHROMIUM

FOR THE PRODUCTION OF WOOD PRESERVATIVE PESTICIDE FORMULATIONS

1. PRODUCT AND COMPANY IDENTIFICATION

COMMON NAME:	Chromium Trioxide, Chromic acid	
CHEMICAL FAMILY:	Metal oxide	
SYNONYMS:	Chromic acid, chromic anhydride	
+CHEMICAL FORMULA:	CrO_3	
PRODUCT CAS NO.:	1333-82-0 Chromium Trioxide	**RTECS:** GB6650000
COMPANY:	Elementis Chromium LP	
ADDRESS:	3800 Buddy Lawrence Drive PO Box 9912	
CITY, STATE, ZIP:	Corpus Christi, TX 78469	
PHONE:	(361) 880-7725	
EMERGENCY PHONE:	(361) 883-6421	**FAX:** (361) 866-1462

2. INGREDIENTS - COMPOSITION/INFORMATION

INGREDIENT	WEIGHT %	PEL-OSHA	TLV-ACGIH	LD 50/LC 50 ROUTE/SPECIES
Chromium Trioxide	99	0.1 mg/m^3 as $Cr0_3$ (ceiling)	0.05 mg/m^3 as Cr (8 hr TWA)	LD50:52mg/kg oral/rat

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Odorless, dark red, noncombustible crystals which may be fatal via skin contact, inhalation or ingestion. OXIDIZER-USE AND STORE AWAY FROM INCOMPATIBLE MATERIALS. CORROSIVE - CAN CAUSE SEVERE BURNS TO EYES, SKIN AND MUCOUS MEMBRANES. CANCER HAZARD by inhalation contains hexavalent chromium. May react explosively with organic materials to sustain fire. AVOID DIRECT CONTACT WITH THIS MATERIAL. Do not eat, drink or smoke in areas where chromic acid is being used or stored. Keep containers closed when not in use.

3. HAZARDS IDENTIFICATION (CONTINUED)

POTENTIAL HEALTH EFFECTS

PRIMARY ROUTE(S) OF ENTRY: Skin and eye contact, inhalation, ingestion.

TARGET ORGANS: Eye, skin, kidneys, respiratory system, liver.

ACUTE EFFECTS:
SIGNS AND SYMPTOMS: Chromic acid can damage the skin and mucous membranes. Chromic acid poisoning may cause vomiting, pain in the esophagus and stomach, and metallic taste. Circulatory collapse may follow with weak and rapid pulse, shallow respiration, and clammy skin. Early deaths are generally associated with shock. Late deaths are usually due to renal or hepatic failure.

EYE: Contact can cause corrosive burns, corneal damage, and blindness. Direct contact may also cause severe damage including burns and blindness.

SKIN: Direct contact with chromic acid can cause sensitization, severe burns, and external ulcers, "Chrome Sores". Chrome sores most commonly occur at breaks in the skin, nailroots, creases over knuckles, finger webs, backs of hands, and on forearms. Massive overexposure could lead to toxic quantities being absorbed through the skin causing systemic poisoning and/or kidney or liver damage.

INGESTION: May be fatal if swallowed. Ingestion of chromic acid can be fatal due to corrosive burns as well as systemic effects. Chromic acid causes violent gastrointestinal irritation and vomiting. Systemic poisoning may follow ingestion with ensuing kidney and liver damage.

INHALATION: Inhalation of dusts and mists can burn the mucous membranes, irritate the respiratory tract and/or cause bronchiospasms and mucous membrane ulceration. Repeated or prolonged inhalation may cause ulceration and perforation of the nasal septum.

CHRONIC EFFECTS: Repeated inhalation of chromic acid causes nasal perforation, skin ulceration, chronic rhinitis, pharyngitis, kidney and liver damage, inflammation of the larynx, changes in the blood and lung cancer. Transfer of chromic acid to the eyes from the fingers or droplets in the air can cause chronic conjunctival inflammation and occasionally a brown band in the cornea.

CARCINOGENICITY: IARC: Yes (1) NTP: Yes(1) OSHA: No

IARC classifies hexavalent chromium compounds as agents(s) which are carcinogenic to humans. NTP classifies chromium(hexavalent) and certain hexavalent chromium compounds as a group of substances which is known to be carcinogenic.

MEDICAL CONDITIONS AGGRAVATED BY EXXPOSURE: Persons with skin, liver, kidney, and respiratory disorders may be more susceptible to the effects of chromates. Persons with known sensitization to chromic acid or chromates or with a history of asthma may be at increased risk from exposure (acute asthmatic attack).

4. FIRST AID MEASURES

EYE CONTACT: Immediately hold eyes open and flush with a steady, gently stream of water for 15 minutes. Remove contact lenses, if present. SEEK IMMEDIATE MEDICAL ATTENTION.

SKIN: Immediately flush affected area(s) with water for at least 15 minutes while removing contaminated clothing and shoes. SEEK MEDICAL ATTENTION IMMEDIATELY. Thoroughly clean contaminated clothing and shoes before reuse or discard.

INHALATION: Remove to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. SEEK MEDICAL ATTENTION IMMEDIATELY. **Note to physician:** Continue to monitor for respiratory distress for 72 hours.

INGESTION: NEVER give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airways clear and give more water. SEEK MEDICAL ATTENTION IMMEDIATELY. Immediate administration of ascorbic acid (dissolved in water) by mouth or intravenously is recommended. (See Notes to Physician.)

Note to Physician: Massive overexposure to chromic acid could lead to kidney failure and death. Death has been avoided in several such cases through the use of early renal dialysis. An effective treatment has been shown to be administration of ascorbic acid by mouth or intravenously. Skin ulcers may be treated by removal from exposure, daily cleansing and debridement, and application of antibiotic cream and dressing to prevent further exposure or contamination.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLAMMABLE LIMITS: LEL: Not applicable UEL: Not applicable

HMIS HAZARD CLASSIFICATION: HEALTH: 3 FLAMMABILITY:0 REACTIVITY: 1 OXIDIZER

EXTINGUISHING MEDIA: Product is nonflammable. Use media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARDS: CONTAINERS MAY EXPLODE WHEN INVOLVED IN FIRE. Chromic acid reacts strongly with materials which are readily oxidized. Reaction may be rapid enough to cause ignition. Combustion can be violent with finely divided oxidizable substances. Oxidizing capability may also sustain a fire involving easily oxidizable material. Thermal decomposition may produce chromic oxide and oxygen.

FIRE FIGHTING EQUIPMENT: Firefighters should wear a NIOSH/MSHA-approved self-contained breathing apparatus in positive pressure mode and bunker gear. Additional chemical protective clothing may be necessary to prevent exposure.

6. ACCIDENTAL RELEASE MEASURES

SPILLS SHOULD BE CLEANED IMMEDIATELY TO PREVENT DISPERSION OF AIRBORNE MISTS AND DUSTS. Isolate hazard area and deny entry to unauthorized and/or unprotected personnel. Clean up personnel should wear appropriate protective equipment including respiratory protection as necessary (See Section 8). Any spill chromic acid should be placed in a separate clean dry closed container. Dike spilled liquid material with suitable inert sorbent (ie., sand, soil, vermiculite) and place in a clean dry container for laterrecycle or disposal. DO NOT DRY SWEEP. Clean spills using wet clean up methods (i.e., misting, etc.) or with a vacuum equipped with a High Efficiency Particulate Air (HEPA) filter. RUN OFF WATER IS CORROSIVE AND TOXIC. Dispose of small quantities through an approved Waste Contractor or reduce hexavalent chromium to trivalent (See Section 13). Dispose of in accordance with all local, state, and federal regulations.

7. HANDLING AND STORAGE

PROTECT CONTAINERS FROM PHYSICAL DAMAGE AND CONTAMINATION. Store in cool, dry location away from ignition sources, combustible, organic or other readily oxidizable materials. Do not eat, drink or smoke in areas where chromic acid is being used or stored. Keep containers closed when not in use. Wash hands thoroughly after handling, before leaving the work area, and before meals or breaks. Wear appropriate personal protective equipment (See Section 8. EXPOSURE CONTROLS/ PERSONAL PROTECTION) to avoid contact with skin, eyes, and clothing. Wear respiratory protection where there is risk of exposure to this product. Remove any contaminated clothing and launder before reuse. DO NOT reuse empty containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: MSHA/ NIOSH - Approved filter type dust respirator in accordance with the requirements of 29 CFR 1910.134.

SKIN PROTECTION: Impervious coveralls, gloves, and footwear or other full-body protective clothing should be worn when the possibility of exposure exists.

EYE PROTECTION: Safety glasses, close fitting chemical safety goggles are recommended when dust or mist is present.

ENGINEERING CONTROLS: Ventilation as necessary to control chromic acid levels to below acceptable exposure guidelines. Local exhaust ventilation with partial enclosure should be employed for processes likely to generate dust, fume or mist/spray. Emergency showers and quick drench eye wash stations should be in close proximity to work area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

PERSONAL SAMPLING: Air sampling for hexavalent chromium: 5.0 µm polyvinyl chloride filter (OSHA ID 103).

OTHER: Cover cuts, grazes or broken skin with impervious dressings to avoid contamination. Containers should be provided for work clothing discarded at the end of the shift or after a contamination incident. Contaminated clothing should be held in these containers until removed for disposal or decontamination. Non-impervious clothing which becomes contaminated should be immediately removed. Areas in which exposure may occur should be limited to authorized personnel. Workers who handle chromic acid should wash hands thoroughly with soap and water if skin becomes contaminated and before eating, smoking, or using toilet facilities.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Dark red crystals
ODOR:	None
pH:	Approx. 1.0 for 1% aqueous solution
BOILING POINT	Decomposes
MELTING POINT:	196 C
VAPOR PRESSURE:	Not Applicable
VAPOR DENSITY:	Not Applicable
BULK DENSITY:	100 lbs/ft^3
SOLUBILITY IN WATER:	62.5% (@ 20 C)
SPECIFIC GRAVITY:	2.70 (H_20 = 1)
% VOLATILE BY VOLUME:	Not Applicable
EVAPORATION RATE:	Not Applicable

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal conditions and use. Keep away from incompatible materials.

INCOMPATIBILITIES: Readily oxidizes combustible, organic or other readily oxidizable materials (wood, paper, sulfur, aluminum, plastics, etc.). Corrosive to metals.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may produce chromic oxide and oxygen.

HAZARDOUS POLYMERIZATION: Will not occur.

THERMAL DECOMPOSITION: Decomposition begins at 196°C.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:	Oral LD50:	(rat)	52 mg/kg (both sexes)
	Inhalation LC50:	(rat)	217 mg/m^3 (4 H exposure - both sexes)
	Dermal LD50:	(rabbit)	57 mg/kg (both sexes)

INGESTION: Human ingestion of 0.5 g of hexavalent chromium has resulted in serious toxicity. Death has resulted from ingestion of 1 to 8 g of hexavalent chromium and survival has been reported following ingestion of 15 g (human).

SKIN: Chromic acid is toxic via skin absorption. Cr (VI) penetrates undamaged skin and reduces to Cr(III) which forms a skin allergen by combining with proteins or other skin components (human).

SKIN CORROSION: Moistened material causes corrosion to the skin.

EYE: Chromic acid injury is characterized by infiltration, vascularization, and opacification of the cornea.

INHALATION: LC50: 217 mg/m^3/4H; rat

CHRONIC: Epidemiological studies in the chromate production, chromate pigment and chromium plating industries indicate that long term exposure to dust and mist containing hexavalent (CrVI) compounds are associated with increased risk of respiratory tract cancer in humans.

Specific soluble compounds of hexavalent chromium that may reasonably be anticipated to be carcinogenic include calcium chromate, chromic acid, lead chromate, strontium chromate and zinc chromate (NTP, *Seventh Annual Report on Carcinogens*, pg. 46, 1994).

SUBCHRONIC: No Data

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE: Cr(VI) may react with particulate matter or pollutants to form Cr(III). Generally chromium is removed from the atmosphere through wet and dry deposition.

The major stable form of chromium in seawater is Cr(VI). Hexavalent chromium may remain unchanged or change slowly in many natural waters due to the low concentration of reducing matter. The oxidizing ability of Cr(VI) in aqueous solution increases at lower pHs. Cr(VI) in water will eventually be reduced to Cr(III) by organic matter. The residence time of chromium in lake water has been estimated to be 4.6 to 18 years. Most chromium released into water will ultimately be deposited in the sediment as the hydroxide after being reduced to Cr(III).

Chromium may be transported from soil through runoff and leaching of water and through aerosol formation. The organic matter present in soil is expected to reduce soluble chromate to insoluble chromic oxide (Cr_2O_3).

12. ECOLOGICAL INFORMATION (CONTINUED)

ECOTOXICITY: This product is toxic to wildlife and aquatic invertebrates. Bioaccumulation of chromium from soil to above ground parts of plants is unlikely. There is no indication of biomagnification of chromium along the terrestrial food chain (soil-plant-animal).

Aquatic Toxicity: 96 H LC50: *Salmo gairdneri* (rainbow trout) 69,000 µg/l as Cr
96 H LC50: *Pimephales promelas* (fathead minnow) 37,000 µg/l as Cr

13. DISPOSAL CONSIDERATIONS

DO NOT DISCHARGE CHROMIC ACID INTO SEWERS OR WATERWAYS. DO NOT INCINERATE OR LANDFILL. Reclaim if possible. If reclamation is not possible, reduce to trivalent Cr(III) by the methods described below or dispose of via an approved Waste Contractor to a licensed disposal site.

1. Slowly and carefully dissolve chromic acid in plenty of water. SOLUTION CAN CAUSE SEVERE BURNS - HANDLE CAREFULLY.
2. Mix with reducing agents (i.e., ferrous sulfate) to reduce to trivalent chromium
3. Precipitate trivalent chromium as chromium hydroxide by adjusting pH to 8.5 with sodium carbonate.
4. Filter and dry precipitated chromium hydroxide. Dispose of in accordance with local, state and federal regulations.

Recycle, reclaim and dispose of in accordance with applicable local, state, and federal regulations. Dispose per 40 CFR Part 261 and 262.

14. TRANSPORT INFORMATION

DOT CLASSIFICATION:

NAME:	Chromium trioxide, anhydrous, toxic (Chromic Acid) RQ
HAZARD CLASS/DIVISION:	5.1
PACKING GROUP:	II
UN NUMBER:	1463
LABEL:	Oxidizer, Corrosive, Toxic

15. REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200: Chromic acid is hazardous under criteria of this rule.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Fire Hazard
Acute Health Hazards
Chronic Health Hazards

SARA 313 INFORMATION: Chromic acid is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 under the broad class of chromium compounds.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT, 40 CFR Part 117, Part 304: Chromic acid is a CERCLA hazardous substance with a reportable quantity (RQ) of 10 pounds. Releases in excess of this amount should be reported to the National Response Center, Washington, D.C. (1-800-424-8802).

RESOURCE CONSERVATION AND RECOVERY (RCRA) ACT 40 CFR 261 SUBPART C: If this product becomes a waste, it may be characterized as a hazardous waste following testing as prescribed by the Resource Conservation and Recovery Act (RCRA) regulations for D007 wastes.

CLEAN AIR ACT (CAA): Chromium is designated as a hazardous air pollutant under Section 112 of the CAA.

CALIFORNIA PROPOSITION 65: Chromic Acid is covered under Proposition 65 for hexavalent chromium. Appropriate warnings should be given.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT: 40 CFR PART 167 Chromic acid is designated as a pesticide under these regulations when used in the production of wood preservative pesticide formulations. The EPA approved FIFRA label is included as the last page of this MSDS.

16. OTHER INFORMATION

KEY:

ACGIH:	American Conference of Governmental Industrial Hygienists
IARC:	International Agency for Research on Cancer
NIOSH:	National Institute for Occupational Safety and Health

NTP:	National Toxicology Program
MSHA:	Mine Safety and Health Administration
OSHA:	Occupational Safety and Health Administration
RTECS:	Registry of Toxic Effects of Chemical Substances
TLV:	Threshold Limit Value
PEL:	Permissible Exposure Limit

The information given above is believed to be accurate and was obtained from sources believed to be reliable. However, the information is provided without any representation or warranty expressed or implied with respect to its accuracy or completeness. It is the user's responsibility to determine the suitability of this product and relevance of this information for their use. We do not assume liability resulting from the use, handling, storage and disposal of this product.

MATERIAL SAFETY DATA SHEET

EM SCIENCE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer.....:
EM SCIENCE
A Division of EM Industries
P.O. Box 70
480 Democrat Road
Gibbstown, N.J. 08027

Preparation Date.: 1/4/94

Information Phone Number.: 856-423-6300
Hours: Mon. to Fri. 8:30-5
Chemtrec Emergency Number: 800-424-9300
Hours: 24 hrs a day

Catalog Number(s):

EX0355

Product Name:
Ethylbenzene
Synonyms:
Phenylethane
Chemical Family:
Aromatic
Formula:
$C_2H_5C_6H_5$
Molecular Weight.:
106.17

2. COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS #	Appr %
Ethylbenzene	100-41-4	100%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
FLAMMABLE LIQUID AND VAPOR.
VAPOR HARMFUL.
IRRITATING TO SKIN, EYES AND MUCOUS MEMBRANES.
May Cause Damage To Lungs, Thorax, Sense Organs, and Central Nervous System.

Appearance:

Clear liquid; aromatic odor

POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)

Symptoms of Exposure:
May be harmful if inhaled, swallowed, or absorbed through the skin. Vapor irritating to eyes and respiratory passages. Can cause headache, depression of Central Nervous System, coma, and respiratory failure.

Medical Cond. Aggravated by Exposure:
Data not available.

Routes of Entry:
Inhalation, ingestion or skin contact.

Carcinogenicity:
The material is not listed (IARC, NTP, OSHA) as cancer causing agent.

4. FIRST AID MEASURES

Emergency First Aid:
GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.
Skin: Wash thoroughly with soap and water.
Eyes: Immediately flush thoroughly with water for at least 15 minutes.
Inhalation: Remove to fresh air; give artificial respiration if breathing has stopped.
Ingestion: Get immediate medical attention.

5. FIRE FIGHTING MEASURES

Flash Point (F): 59F (cc)
Flammable Limits LEL (%): 1.00
Flammable Limits UEL (%): 6.70
Extinguishing Media:
CO_2, dry chemical, alcohol foam

Fire Fighting Procedures:
Wear self-contained breathing apparatus.

Fire & Explosion Hazards:
Vapor can travel distances to ignition source and flash back.

6. ACCIDENTAL RELEASE MEASURES

Spill Response:
Evacuate the area of all unnecessary personnel. Wear suitable protective equipment listed under Exposure / Personal Protection. Eliminate any ignition sources until the area is determined to be free from explosion or fire hazards. Contain the release and eliminate its source, if this can be done without risk. Take up and containerize for proper disposal as described

under Disposal. Comply with Federal, State, and local regulations on reporting releases. Refer to Regulatory Information for reportable quantity and other regulatory data.
EM SCIENCE recommends Spill-X absorbent agents for various types of spills. Additional information on the Spill-X products can be provided through the EM SCIENCE Technical Service Department (609) 423-6300. The following EM SCIENCE Spill-X absorbent is recommended for this product:

SX0863 Solvent Spill Treatment Kit

7. HANDLING AND STORAGE

Handling & Storage:
Keep container closed. Store in a cool, dry area away from ignition sources and oxidizers. Do not breathe vapor. Do not get in eyes, on skin, or on clothing. Electrically ground all equipment when handling this product.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT:
Ventilation, Respiratory Protection, Protective Clothing, Eye Protection:
Material should be handled or transferred in an approved fume hood or with adequate ventilation. Protective gloves should be worn to prevent skin contact (Viton or equivalent) Safety glasses with side shields should be worn at all times. Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.

Work/Hygenic Practices:
Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

EXPOSURE GUIDELINES

OSHA - PEL:

	TWA		STEL		CL		
Component	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	Skin
Ethylbenzene	100	435	125	545			

ACGIH - TLV:

	TWA		STEL		CL		
Component	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	Skin
Ethylbenzene	100	434	125	543			

If there are no exposure limit numbers listed in the Exposure Guidelines chart, this indicates that no OSHA or ACGIH exposure limts have been established.

9. PHYSICAL AND CHEMCIAL PROPERTIES

Boiling Point (C 760 mmHg) : 136C
Melting Point (C) : -95C
Specific Gravity ($H_2 0$ = 1) : 0.867
Vapor Pressure (mm Hg) : 10 20C
Percent Volatile by vol (%): 100%
Vapor Density (Air = 1) : 3.7
Evaporation Rate (BuAc = 1): 1
Solubility in Water (%) : Insoluble
Appearance :
Clear liquid; aromatic odor

10. STABILITY AND REACTIVITY

Stability: Yes

Hazardous Polymerization:
Does not occur

Hazardous Decomposition:
CO_x

Conditions to Avoid:
Heat; contact with ignition sources

Materials To Avoid:

( ) Water
(X) Acids
(X) Bases
( ) Corrosives
(X) Oxidizers
(X) Other: NH_3

11. TOXICOLOGICAL INFORMATION

Toxicity Data

orl-rat LD50: 3500 mg/kg
ihl-hmn TCLo: 100 ppm/8H
skn-rbt LD50: 17800 mg/kg

Toxicological Findings:
Test on laboratory animals indicate material may produce adverse
mutagenic and reproductive effects.
Cited in Registry of Toxic Effects of Chemical Substances (RTECS)

12. DISPOSAL CONSIDERATIONS

EPA Waste Numbers: D001

Treatment:
Incineration, fuels blending or recycle. Contact your local permitted waste disposal site (TSD) for permissible treatment sites. ALWAYS CONTACT A PERMITTED WASTE DISPOSER (TSD) TO ASSURE COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

13. TRANSPORT INFORMATION

DOT Proper Shipping Name:
Ethylbenzene

DOT ID Number :
UN1175

14. REGULATORY INFORMATION

TSCA Statement:
The CAS number of this product is listed on the TSCA Inventory.

Component	SARA EHS (302)	SARA EHS TPQ (lbs)	CERCLA RQ (lbs)
Ethylbenzene			1000

Component	OSHA Floor List	SARA 313	DeMinimis for SARA 313 (%)
Ethylbenzene	Y	Y	1.0

If there is no information listed on the regulatory information chart, this indicates that the chemical is not covered by the specific regulation listed.

15. OTHER INFORMATION

Comments:

NFPA Hazard Ratings:

Health : 2
Flammability : 3
Reactivity : 0
Special Hazards :

Revision History: 11/1/81 6/5/87 10/27/87 1/27/89
/1/91

| = Revised Section

N/A = Not Available

N/E = None Establised

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Material Safety Data Sheet
Name M-525-1-5X PAH MIXTURES 0.5 MG/ML FOR METHOD **MSDS** cfcbj
Company ACCUSTANDARD INC **FSC** 6550

MSDS Safety Information

FSC: 6550
MSDS Date: 10/26/1994
MSDS Num: CFCBJ
LIIN: 00F050479
Product ID: M-525-1-5X PAH MIXTURES 0.5 MG/ML FOR METHOD 525
MFN: 01
Responsible Party
Cage: 0U4A8
Name: ACCUSTANDARD INC
Address: 25 SCIENCE PK SUITE 687
City: NEW HAVEN CT 06511-5000
Info Phone Number: 203-786-5290
Emergency Phone Number: 203-786-5290
Review Ind: Y
Published: Y

Preparer Co. when other than Responsible Party Co.

Cage: 0U4A8
Name: ACCUSTANDARD INC
Address: 125 MARKET ST
City: NEW HAVEN CT 06513

Contractor Summary

Cage: 0U4A8
Name: ACCUSTANDARD INC
Address: 125 MARKET ST
City: NEW HAVEN CT 06513
Phone: 800-442-5290

Ingredients

Cas: 208-96-8
RTECS #: AB1254000
Name: ACENAPHTHYLENE
% Wt: 0.05
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

Cas: 120-12-7
RTECS #: CA9350000
Name: ANTHRACENE (IARC CARCINOGEN - GROUP 3) *96-2*
% Wt: 0.05
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

Cas: 56-55-3
RTECS #: CV9275000
Name: BENZO (A) ANTHRACENE, BENZ (A) ANTHRACENE

% Wt: 0.05
EPA Rpt Qty: 10 LBS
DOT Rpt Qty: 10 LBS

Cas: 50-32-8
RTECS #: DJ3675000
Name: BENZO (A) PYRENE (SUSPECTED HUMAN CARCINOGEN BY ACHIGH ANDamp; NTP, ANIMAL SUFFICIENT BY IARC, IARC GROUP 2A) *96-2*
% Wt: 0.05
ACGIH TLV: A2 CARCINOGEN
EPA Rpt Qty: 1 LB
DOT Rpt Qty: 1 LB

Cas: 205-99-2
RTECS #: DF6350000
Name: BENZO (B) FLUORANTHENE (SUSPECTED CARCINOGEN BY NTP, IARC GROUP 2B) *96-2*
% Wt: 0.05
Other REC Limits: A2 CARCINOGEN
EPA Rpt Qty: 1 LB
DOT Rpt Qty: 1 LB

Cas: 191-24-2
RTECS #: DI6200500
Name: BENZO (GHI) PERYLENE
% Wt: 0.05
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

Cas: 207-08-9
RTECS #: DF6350000
Name: BENZO (K) FLUORANTHENE
% Wt: 0.05
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

Cas: 218-01-9
RTECS #: GC0700000
Name: CHRYSENE (SUSPECTED HUMAN CARCINOGEN BY ACGIH ANDamp; IARC, IARC GROUP 3) *96-2*
% Wt: 0.05
ACGIH TLV: A2 CARCINOGEN
EPA Rpt Qty: 100 LBS
DOT Rpt Qty: 100 LBS

Cas: 53-70-3
RTECS #: HN2625000
Name: DIBENZ (A,H) ANTHRACENE
% Wt: 0.05
EPA Rpt Qty: 1 LB
DOT Rpt Qty: 1 LB

Cas: 86-73-7
RTECS #: LL5670000
Name: FLUORENE
% Wt: 0.05
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

Cas: 193-39-5
RTECS #: NK9300000
Name: INDENO (1,2,3,CD) PYRENE
% Wt: 0.05
EPA Rpt Qty: 100 LBS
DOT Rpt Qty: 100 LBS

Cas: 85-01-8
RTECS #: SE7175000
Name: PHENANTHRENE
% Wt: 0.05
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

Cas: 129-00-0
RTECS #: UR2450000
Name: PYRENE
% Wt: 0.05
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

Cas: 67-64-1
RTECS #: AL3150000
Name: ACETONE; DIMETHYL KETONE; 2-PROPANONE
% Wt: 99.35
OSHA PEL: 2400 MG/CUM
ACGIH TLV: 750 PPM
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

Health Hazards Data

Route Of Entry Inds - Inhalation: YES
Skin: NO
Ingestion: YES
Carcinogenicity Inds - NTP: YES
IARC: YES
OSHA: NO
Effects of Exposure: HARMFUL IF INHALED/SWALLOWED. PROLONGED EXPOSURE/HIGH CONCENTRATIONS MAY CAUSE IRRITATION OF EYES ANDamp; RESPIRATORY TRACT. MAY CAUSE DAMAGE TO CENTRAL NERVOUS SYSTEM, LIVER ANDamp; KIDNEYS. SKIN/EYES: IRRITATIO N.
Explanation Of Carcinogenicity: SEE INGREDIENTS
Signs And Symptions Of Overexposure: HEADACHE, DIZZINESS, NAUSEA, IRRITATION, NARCOSIS, UNCONSCIOUSNESS.
Medical Cond Aggravated By Exposure: SKIN CONDITIONS.
First Aid: SKIN: WASH THOROUGHLY W/SOAP ANDamp; WATER. EYES: FLUSH THOROUGHLY W/WATER FOR 15 MINS. INHALATION: REMOVE TO FRESH AIR. GIVE CPR IF NEEDED. INGESTION: IF CONSCIOUS, DRINK WATER ANDamp; INDUCE VOMITING IMMEDIATEL Y AS DIRECTED BY MEDICAL PERSONNEL. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Handling and Disposal

Spill Release Procedures: WEAR PROTECTIVE EQUIPMENT. ELIMINATE IGNITION SOURCES. CONTAIN THE RELEASE ANDamp; ELIMINATE ITS SOURCE, W/O RISK.
Waste Disposal Methods: DISPOSE AS HAZARDOUS WASTE IAW/FEDERAL, STATE ANDamp; LOCAL REGULATIONS.
Handling And Storage Precautions: KEEP CONTAINERS CLOSED. STORE IN A COOL AREA AWAY FROM IGNITION SOURCES ANDamp; OXIDIZERS.
Other Precautions: DON'T BREATHE VAPOR, GET IN EYES. AVOID PROLONGED/REPEATED SKIN CONTACT.

Fire and Explosion Hazard Information

Flash Point Method: CC
Flash Point Text: 0F
Lower Limits: 2.6
Upper Limits: 12.8
Extinguishing Media: DRY CHEMICAL, ALCOHOL FOAM, WATER SPRAY, CO2.
Fire Fighting Procedures: USE WATER SPRAY TO COOL EXPOSED CONTAINERS. WEAR SCBA.
Unusual Fire/Explosion Hazard: DANGEROUS FIRE ANDamp; EXPLOSIVE HAZARD. VAPORS CAN TRAVEL DISTANCES TO IGNITION SOURCES ANDamp; FLASH BACK.

Control Measures

Respiratory Protection: IF WORKPLACE EXPOSURE LIMITS ARE EXCEEDED, USE NIOSH/MSHA APPROVED AIR SUPPLIED RESPIRATOR.
Ventilation: HANDLE/TRANSFER IN AN APPROVED FUME HOOD/ADEQUATE VENTILATION.

Protective Gloves: BUTYL RUBBER, POLYURETHANE, POLYETHYLENE
Eye Protection: SAFETY GLASSES W/SIDE SHIELDS
Other Protective Equipment: EYE WASH AND SAFETY EQUIPMENT SHOULD BE READILY AVAILABLE.
Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. WASH THOROUGHLY AFTER HANDLING.
Supplemental Safety and Health: FOR RESEARCH ANDamp; DEVELOPMENT USE ONLY. NOT FOR MANUFACTURING/COMMERCIAL PURPOSES.

Physical/Chemical Properties

B.P. Text: 132.8F
M.P/F.P Text: -137.2F
Vapor Pres: 184
Vapor Density: 2
Spec Gravity: 0.7905
Evaporation Rate ANDamp; Reference: (BU AC =1): 14.48
Solubility in Water: MISCIBLE
Appearance and Odor: COLORLESS LIQUID W/PUNGENT ODOR.
Percent Volatiles by Volume: ANDgt;99.9

Reactivity Data

Stability Indicator: YES
Stability Condition To Avoid: HEAT, IGNITION SOURCES.
Materials To Avoid: ACIDS, BASES, OXIDIZERS, POTASSIUM T-BUTOXIDE, NITRIC AND SULFURIC ACID MIXTURE, BROMINE, CHLORINE.
Hazardous Decomposition Products: CARBON OXIDES.
Hazardous Polymerization Indicator: NO

Toxicological Information

Ecological Information

MSDS Transport Information

Regulatory Information

Other Information

HAZCOM Label

Product ID: M-525-1-5X PAH MIXTURES 0.5 MG/ML FOR METHOD 525
Cage: 0U4A8
Company Name: ACCUSTANDARD INC
Street: 125 MARKET ST
City: NEW HAVEN CT
Zipcode: 06513
Health Emergency Phone: 203-786-5290
Label Required IND: Y
Date Of Label Review: 10/12/1999
Status Code: A
Origination Code: G
Hazard And Precautions: HARMFUL IF INHALED/SWALLOWED. PROLONGED EXPOSURE/HIGH CONCENTRATIONS MAY CAUSE IRRITATION OF EYES ANDamp; RESPIRATORY TRACT. MAY CAUSE DAMAGE TO CENTRAL NERVOUS SYSTEM, LIVER ANDamp; KIDNEYS. SKIN/EYES: IRRITATIO N.

Disclaimer

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RELATED RESOURCES

PDF File for Printing
(See PDF Info)

Public Health Statement

Toxicological Profile

Minimal Risk Levels

Division of Toxicology

CONTENTS

Highlights

What is it?

What happens to it in the environment?

How might I be exposed to it?

How can it affect my health?

How likely is it to cause cancer?

How does it affect children?

How can families reduce their risk for exposure to it?

Is there a medical test for exposure?

Are there federal recommendations?

Contact for more information

More external safety and chemistry information

ToxFAQs™ for

Polychlorinated Biphenyls (PCBs)

February 2001

This fact sheet answers the most frequently asked health questions about polychlorinated biphenyls (PCBs). For more information, you may call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polychlorinated biphenyls (PCBs)?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily

and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to polychlorinated biphenyls (PCBs) when they enter the environment?

- PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.
- PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.
- PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.
- PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to polychlorinated biphenyls (PCBs)?

- PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.
- PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.
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- PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How can polychlorinated biphenyls (PCBs) affect my health?

The most commonly observed health effects in people exposed to large

amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are polychlorinated biphenyls (PCBs) to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How do polychlorinated biphenyls (PCBs) affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to polychlorinated biphenyls (PCBs)?

- You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories

to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

- Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.
- Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.
- If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to polychlorinated biphenyls (PCBs)?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat

illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

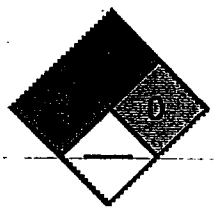
For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
Atlanta, GA 30333
Phone: 1-888-422-8737
FAX: (404)498-0057

External safety and chemistry information (please see our disclaimer):

Octachlorobiphenyl
$C_{12}H_2Cl_8$

Stereo Image
MDL Molfile



NFPA Label Key

Vermont SIRI MSDS Archive

ATSDR Information Center / ATSDRIC@cdc.gov / 1-888-422-8737

This page last updated on June 11, 2001

EXXON CHEMICAL AMERICAS -- TOLUENE - TOLUENE,TECHNICAL
MATERIAL SAFETY DATA SHEET
NSN: 6810005798431
Manufacturer's CAGE: 72190
Part No. Indicator: A
Part Number/Trade Name: TOLUENE

General Information

Item Name: TOLUENE,TECHNICAL
Company's Name: EXXON CHEMICAL AMERICAS
Company's P. O. Box: 3272
Company's City: HOUSTON
Company's State: TX
Company's Country: US
Company's Zip Code: 77001
Company's Emerg Ph #: 713-870-6000/800-424-9300(CHEMTREC)
Company's Info Ph #: 713-870-6885
Distributor/Vendor # 1: CSD, INC (409-756-1065)
Distributor/Vendor # 1 Cage: 4N760
Record No. For Safety Entry: 009
Tot Safety Entries This Stk#: 011
Status: SE
Date MSDS Prepared: 08MAY92
Safety Data Review Date: 27AUG97
Supply Item Manager: CX
MSDS Serial Number: BTKRC
Specification Number: TT-T-548
Spec Type, Grade, Class: NONE
Hazard Characteristic Code: F3
Unit Of Issue: QT
Unit Of Issue Container Qty: 32.000 OZ
Type Of Container: CAN
Net Unit Weight: 1.81 LB/QT
NRC/State License Number: NONE
Net Propellant Weight-Ammo: NONE

Ingredients/Identity Information

Proprietary: NO
Ingredient: TOLUENE (SARA 313) (CERCLA)
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM; Z-2
ACGIH TLV: S, 50 PPM; 9596
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: CLEAR COLORLESS LIQUID, AROMATIC (HYDROCARBON) ODOR
Boiling Point: 230F,110C
Melting Point: <-76F,<-60C
Vapor Pressure (MM Hg/70 F): 47 MM
Vapor Density (Air=1): 3.20
Specific Gravity: 0.87
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: 2.4 (N-BUTYL ACETATE = 1)
Solubility In Water: 0.05%

Percent Volatiles By Volume: 100
Corrosion Rate (IPY): UNKNOWN

Fire and Explosion Hazard Data

Flash Point: 45.0F,7.2C
Flash Point Method: TCC
Lower Explosive Limit: 1.4
Upper Explosive Limit: 7.4
Extinguishing Media: USE WATER SPRAY TO COOL FIRE EXPOSED SURFACES AND TO PROTECT PERSONNEL. USE WATER SPRAY TO DISCHARGE VAPORS.
Special Fire Fighting Proc: EITHER ALLOW FIRE TO BURN UNDER CONTROLLED CONDITIONS OR EXTINGUISH WITH FOAM OR DRY CHEMICAL. TRY TO COVER LIQUID SPILLS WITH FOAM.
Unusual Fire And Expl Hazrds: EITHER THE LIQUID OR VAPOR MAY SETTLE IN LOW AREAS OR TRAVEL SOME DISTANCE ALONG THE GROUND OR SURFACE TO IGNITION SOURCES WHERE THEY MAY IGNITE OR EXPLODE.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NOT APPLICABLE.
Materials To Avoid: STRONG OXIDIZING AGENTS, CONCENTRATED NITRIC OR SULFURIC ACID, HALOGENS OR MOLTEN SULPHUR.
Hazardous Decomp Products: NONE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): WILL NOT OCCUR

Health Hazard Data

LD50-LC50 Mixture: LD50 (ORAL RAT) IS UNKNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
VAPOR/AEROSOL CONCENTRATIONS >1000 PPM IRRITATE EYES & RESPIRATORY TRACT. INGESTED:SMALL AMTS ASPIRATED INTO LUNGS MAY CAUSE MILD TO SEVERE PULMONARY INJURY.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: MFR LISTED NO INFORMATION ABOUT THE CARCINOGENICITY OF THIS MATERIAL.
Signs/Symptoms Of Overexp: INHALATION:HEADACHE, DIZZINESS, ANESTHESIA, DROWSINESS, UNCONSCIOUSNESS, BRAIN DAMAGE & POSSIBLY DEATH.
Med Cond Aggravated By Exp: EXISTING DERMATITIS.
Emergency/First Aid Proc: EYE:FLUSH WITH LARGE AMOUNTS OF WATER UNTIL IRRITATION SUBSIDES. SKIN:FLUSH WITH LARGE AMOUNTS OF WATER; USE SOAP IF AVAILABLE. REMOVE GROSSLY CONTAMINATED CLOTHING AND LAUNDER BEFORE REUSE. INHALED:REMOVE THE EFFECTED VICTIM FROM EXPOSURE. ADMINISTER ARTIFICIAL RESPIRATION IF BREATHING IS STOPPED. INGESTED: DO NOT INDUCE VOMITING. KEEP AT REST. GET PROMPT MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ELIMINATE SOURCES OF IGNITION. PREVENT ADDITIONAL DISCHARGE IF W/O HAZARD. SMALL SPILL:IMPLEMENT CLEAN-UP PROCEDURES. LARGE SPILL:IMPLEMENT CLEANUP PROCEDURES. ISOLATE AREA 7 ADVISE AUTHORITIES. PREVENT FROM ENTERING SEWER, WATERWWAYS. RECOVER.
Waste Disposal Method: RECOVER BY PUMPING OR WITH A SUITABLE ABSORBENT. CONSULT AN EXPERT ON DISPOSAL OF RECOVERED MATERIAL AND ENSURE CONFORMITY

TO LOCAL DISPOSAL REGULATIONS.
Precautions-Handling/Storing: STORE AT AMBIENT TEMPERATURE & ATMOSPHERIC PRESSURE. USE PROPER GROUNDING PROCEDURES.
Other Precautions: HEALTH STUDIES HAVE SHOWN THAT HYDROCARBONS POSE POTENTIAL HUMAN HEALTH RISKS WHICH VARY FROM PERSON TO PERSON.

Control Measures

Respiratory Protection: WHERE AIRBORN CONCENTRATIONS EXCEED LIMITS AND VENTILATION & WORK PRACTICE DOES NOT REDUCE EXPOSURE TO BELOW LIMITS, USE A NIOSH/MSHA APPROVED RESPIRATIOR TO PREVENT OVEREXPOSURE.
Ventilation: USE LOCAL EXHAUST TO CONTROL EMISSIONS NEAR SOURCE. USE MECHANICAL VENTILATION FOR ECNLOSED SPACES.
Protective Gloves: CHEMICAL RESISTANT
Eye Protection: SAFETY GLASSES W/SIDE SHIELDS
Other Protective Equipment: LONG SLEEVES. HMIS RECOMMENDS GOGGLES REPLACE RHE ABOVE RECOMMENDATION FOR EYE PROTECTION.
Work Hygienic Practices: MINIMIZE EXPOSURE TO LIQUIDS, VAPORS, MISTS OR FUMES.
Suppl. Safety & Health Data: FLAMMABLE LIQUID.

Transportation Data

Trans Data Review Date: 97253
DOT PSN Code: OJY
DOT Proper Shipping Name: TOLUENE
DOT Class: 3
DOT ID Number: UN1294
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: OSR
IMO Proper Shipping Name: TOLUENE
IMO Regulations Page Number: 3285
IMO UN Number: 1294
IMO UN Class: 3.2
IMO Subsidiary Risk Label: -
IATA PSN Code: YEL
IATA UN ID Number: 1294
IATA Proper Shipping Name: TOLUENE
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: YEL
AFI Prop. Shipping Name: TOLUENE
AFI Class: 3
AFI ID Number: UN1294
AFI Pack Group: II
AFI Special Prov: P5
AFI Basic Pac Ref: A7.3

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 27AUG97
Label Status: F
Common Name: TOLUENE
Chronic Hazard: YES
Signal Word: WARNING!

Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-Moderate: X
Reactivity Hazard-None: X
VAPOR/AEROSOL CONCENTRATIONS >1000 PPM IRRITATE EYES & RESPIRATORY TRACT. INGESTED:SMALL AMTS ASPIRATED INTO LUNGS MAY CAUSE MILD TO SEVERE PULMONARY INJURY. STORE AT AMBIENT TEMPERATURE. FIRST AID:EYE:FLUSH WITH WATER UNTIL IRRITATION SUBSIDES. SKIN:WASH WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING AND LAUNDER BEFORE REUSE. INHALED:REMOVE THE VICTIM FROM EXPOSURE. ADMINISTER ARTIFICIAL RESPIRATION IF BREATHING IS DIFFICULT/STOPPED. INGESTION: DO NOT INDUCE VOMITING. GET PROMPT MEDICAL ATTENTION.
Protect Skin: Y
Protect Respiratory: Y
Label Name: EXXON CHEMICAL AMERICAS
Label P.O. Box: 3272
Label City: HOUSTON
Label State: TX
Label Zip Code: 77001
Label Country: US
Label Emergency Number: 713-870-6000/800-424-9300(CHEMTREC)

Back to chemicals

Material Safety Data Sheet

o-Xylene

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: o-Xylene

OTHER/GENERIC NAMES: Ortho-xylene, o- Dimethylbenzene

PRODUCT USE: Solvent

MANUFACTURER: Honeywell, Burdick & Jackson
1953 South Harvey Street
Muskegon, MI 49442

FOR MORE INFORMATION CALL:
(Monday-Friday, 8:00am-5:00pm)
1-800-368-0050

IN CASE OF EMERGENCY CALL:
(24 Hours/Day, 7 Days/Week)
1-800-707-4555 or Chemtrec 1-800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
o-Xylene	95-47-6	100

Trace impurities and additional material names not listed above may also appear in Section 15 towards the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Flammable Liquid and Vapor. Can cause damage to the Central nervous system, liver, kidneys, lungs, skin, and eyes.

POTENTIAL HEALTH HAZARDS

SKIN: Irritant. Can cause dermatitis through defatting of tissue. Rash or blisters may occur.

EYES: Irritant. Symptoms may include tearing, bl.urring, and sensitivity to light.

INHALATION: Irritant. Can cause nausea, vomiting, headache, drowsiness, numbness, lung congestion and lowered body temperature.

INGESTION: Can cause digestive disorders, bloody vomit, intoxication, liver and kidney damage..

DELAYED EFFECTS: Prolonged or repeated exposure can cause liver and kidney damage and coma. Can be fatal.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

INGREDIENT NAME	NTP STATUS	IARC STATUS	OSHA LIST
No Ingredients listed in this section			

4. FIRST AID MEASURES

SKIN: Wash with soap and water and flush with water. Remove contaminated clothing and wash before reuse. Get medical attention.

EYES: Immediately flush eyes with plenty of water for a least 15 minutes. Get medical attention.

INHALATION: Remove from exposure area to fresh air. If victim is not breathing administer artificial respiration according to your level of training and obtain professional medical assistance immediately.

INGESTION: Do not induce vomiting. Contact physician immediately.

ADVICE TO PHYSICIAN: Treat symptomatically.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT:	63° F (17° C)
FLASH POINT METHOD:	Closed Cup
AUTOIGNITION TEMPERATURE:	867 °F
UPPER FLAME LIMIT (volume % in air):	6.7%
LOWER FLAME LIMIT (volume % in air):	0.9%
FLAME PROPAGATION RATE (solids):	Not applicable
OSHA FLAMMABILITY CLASS:	IB

EXTINGUISHING MEDIA:
Dry Chemical, foam, or Carbon Dioxide

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Vapors are heavier than air, and may migrate to a low area and flashback in a fire or remote ignition condition.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:
Do not release runoff from fire control measures into waterways or sewers.
Water will not be effective in extinguishing a fire. Use water spray to cool fire-exposed containers and to reduce rate of burning, taking care not to spread the fire. Heat will build pressure and rupture closed storage containers. Wear NIOSH approved self-contained breathing apparatus, and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment.)
Eliminate sources of ignition. Isolate the spill area. Stop leak in a safe and practical manner. (If leak cannot be stopped easily and safely, advise trained emergency response personnel of the situation.) Using inert material (such as ground corncobs) dike the spilled solvent to prevent it from running into drains or waterways.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

NORMAL HANDLING: (Always wear recommended personal protective equipment.)
Ground containers for transfer of contents. Keep away from sparks, open flames and ignition sources, Do not get in eyes, on skin or clothing. Use with adequate ventilation. No smoking in areas of use.

STORAGE RECOMMENDATIONS:
Store in an area designed for storage of flammable liquids. (OSHA 29 CFR 1910.106)
Store in a cool, well-ventilated area away from oxidizers and ignition sources. Protect against physical damage. Outside or detached storage is preferable. Inside storage should be in a standard flammable liquids storage room or cabinet. No smoking in storage areas. Once liquid solvent has been completely dispensed, containers which appear "empty" should be handled in the same manner as when they were "full" of liquid solvent.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:
Provide general or local exhaust ventilation systems to maintain airborne concentrations below exposure levels. Regularly inspect all electrical and mechanical equipment used with or near toluene. Ground and bond metal containers to minimize static sparks.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: Protective gloves and clothing are recommended. Viton or nitrile rubber offers acceptable chemical resistance. Clothing should be static free.

EYE PROTECTION: Wear safety glasses with non-perforated sideshields for normal handling. Goggles or a full face shield may be necessary depending on quantity of material and conditions of use.

RESPIRATORY PROTECTION: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (*29 CFR 1910.134*) and, if necessary, wear a MSHA/NIOSH-approved respirator. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

ADDITIONAL RECOMMENDATIONS: Emergency eyewash fountains and safety showers should be available in the vicinity of any potential exposure.

o-Xylene

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
o-Xylene	100 ppm	100 ppm	None

* = Limit established by Honeywell International, Inc.
** = Workplace Environmental Exposure Level (AIHA).
*** = Biological Exposure Index (ACGIH).

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:
None

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Clear		
PHYSICAL STATE:	Liquid		
MOLECULAR WEIGHT:	106.17		
CHEMICAL FORMULA:	C_8H_{10}		
ODOR:	Threshold = < 1ppm		
SPECIFIC GRAVITY (water = 1.0):	0.8802		
SOLUBILITY IN WATER (weight %):	0.175% @ 20° C		
pH:	Not Applicable		
BOILING POINT:	144.41° C		
MELTING POINT:	-25.18°C		
VAPOR PRESSURE:	5.2mm Hg @ 25° C		
VAPOR DENSITY (air = 1.0):	3.7		
EVAPORATION RATE:	0.7	**COMPARED TO:**	Butyl Acetate = 1
% VOLATILES:			
FLASH POINT:	63°F		

(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

NORMALLY STABLE? (CONDITIONS TO AVOID):
Stable under normal storage and handling conditions.

INCOMPATIBILITIES:
Strong acids, oxidizers and bases.

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal oxidation can produce toxic fumes of carbon monoxide.

HAZARDOUS POLYMERIZATION:
Not expected to occur.

MATERIAL SAFETY DATA SHEET

o-Xylene

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:
Intraperitoneal-Mouse LD_{50}:1364 mg/kg

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:
Liver or kidney damage may occur.

OTHER DATA:
None.

12. ECOLOGICAL INFORMATION

guppy (Poecilia reticulata) 7d GLNK0069 LC50 35 mg/l
fathead minnows (n.s.i.) (1; 24; 48; 72; 96h) GLNK0069 LC_{50},S 46; 42; 42; 42; 42 mg/l

goldfish (Carassius auratus) 96h GLNK0069 LC_{50} 17 mg/l (n.s.i.)

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded? Yes
If yes, the RCRA ID number is: D001, U239

OTHER DISPOSAL CONSIDERATIONS:

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT PROPER SHIPPING NAME:	Xylene
US DOT HAZARD CLASS:	3, Flammable Liquid
US DOT ID NUMBER:	UN1307
US DOT PACKING GROUP:	II
NA EMERGENCY RESPONSE GUIDE:	130

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: Listed on Inventory
OTHER TSCA ISSUES: None

SARA TITLE III/CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME	SARA/CERCLA RQ (lb)	SARA EHS TPQ (lb)
o-Xylene	1000 lbs	

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Acute, Fire

SARA 313 TOXIC CHEMICALS:
The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percents are found in Section 2.

INGREDIENT NAME	COMMENT
o-Xylene	

STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME	WEIGHT %	COMMENT
No Ingredients listed in this section.		

ADDITIONAL REGULATORY INFORMATION:
RTECS = ZE2450000

WHMIS CLASSIFICATION (CANADA):
Class B, Division 2

FOREIGN INVENTORY STATUS:
EC No: 202-422-2

ATTACHMENT 4
HEALTH AND SAFETY PLAN
STANDARD SAFE WORK PRACTICES

STANDARD SAFE WORK PRACTICES

1) Eating, drinking, chewing tobacco, smoking and carrying matches or lighters is prohibited in a contaminated or potentially contaminated area or where the possibility for the transfer of contamination exists.

2) Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or ground. Do not place monitoring equipment on potentially contaminated surfaces (i.e., ground, etc).

3) All field crew members should make use of their senses to alert them to potentially dangerous situations in which they should not become involved; i.e., presence of strong and irritating or nauseating odors.

4) Prevent, to the extent possible, spills. In the event that a spill occurs, contain liquid if possible.

5) Field crew members shall be familiar with the physical characteristics of investigations, including:

   - Wind direction
   - Accessibility to associates, equipment, vehicles
   - Communication
   - Hot zone (areas of known or suspected contamination)
   - Site access
   - Nearest water sources

6) All wastes generated during activities on-site should be disposed of as directed by the project manager or his on-site representative.

7) Protective equipment as specified in the section on personnel protection will be utilized by workers during the initial site reconnaissance, and other activities.

ATTACHMENT 5
HEALTH AND SAFETY PLAN
DRILLING PROTOCOL

Note: This Attachment will be completed by Contractor prior to the start of drilling activities.

ATTACHMENT 6
HEALTH AND SAFETY PLAN
HONEYWELL-CONTRACTOR
NEAR MISS/INCIDENT INVESTIGATION REPORT

HONEYWELL - CONTRACTOR
NEAR MISS / INCIDENT INVESTIGATION REPORT *

* To be completed by the Contractor Company with assistance from Honeywell personnel

Date Incident Reported:	Honeywell Location:	Honeywell Contact:

Date of Incident:	Time of Incident:	Name of Contractor Company:	
Name of Individual(s) Involved w/Incident:		Name of Injured Worker (if applicable):	Name of Supervisor/Foreman:
If an Individual was Injured, were they working under the direct supervision of Honeywell?		Age of Individual Involved:	Job Classification/Title/Craft:
Length of Work Experience at Job Classification:		Length of Employment with Company:	Length of Time Working at Site:
Was the Individual Involved with the Incident Performing their Regular Job? If "No", explain why:		Date of Site Safety Orientation:	Last Formal/Documented Safety Meeting Attended:
Hours Worked that Day/shift Prior to the Incident:	Hours Worked that Week Prior to the Incident:	Consecutive Days/Shifts Worked Prior to the Incident:	Last Day Off Prior to the Incident:

Description of incident according to the individual(s) involved or injured (including what happened and how the incident occurred):

According to the individual(s) involved with the incident or injured, what could have been done differently to prevent this incident from occurring?

Why weren't these done prior to the incident?

Describe any First Aid or Medical Treatment Provided On Site and/or at a Medical Facility. **NOTE: Any follow-up treatment at a later date must be communicated to Honeywell (Contractor Safety Leader).**

Date that the Injured Individual Returned to Work?	Any Work Restrictions or Lost Time? If "Yes", describe: **NOTE: Any work restrictions or lost time at a later date must be communicated to Honeywell (Contractor Safety Leader).**
Was there any Property Damage?	If "Yes", describe:

Contractor Supervisor/Foreman should complete the information below with an Investigation Team

Team Investigation – List the Possible Causes of the Incident Below.

For Each Possible Cause Listed Above, Reply "Why" or "Why not" the Cause Occurred.

Corrective Action(s) Taken - List Person(s) Responsible and Target Date:

Contractor Investigation Team - Leader & Members:

Approval (Individual Involved/Injured):	Title:	Date:
Supervisor Approval (Print Name):	Title:	Date:
Honeywell Site Approval (Print Name):	Title:	Date:

ATTACHMENT 7
HEALTH AND SAFETY PLAN
HONEYWELL CONTRACTOR
SAFETY HANDBOOK

This informational Handbook is intended to provide a generic, non-exhaustive overview of a particular standards-related topic. This publication does not itself alter or determine compliance responsibilities, which are set forth in OSHA standards themselves and in the Occupational Safety and Health Act of 1970. Since the regulations, interpretations and enforcement policy may change over time, it may be necessary to seek additional guidance on OSHA compliance requirements. Any and all deviations from the guidelines and rules set forth in this Handbook shall have prior approval by Honeywell.

This Handbook serves as a guide and reference for the minimum rules and standards for contractors performing capital work, maintenance, repair, dismantlement, remediation or other activities that have the potential for an incident.

This Handbook should be issued to each contract employee working at a Honeywell facility, location or site. The perforated page at the back of the Handbook must be signed and returned to the Honeywell contact/representative prior to commencing work. After reviewing each Section of this Handbook, specific attention should be focused on the topics that will be encountered during the project/task.

Contract employees must also be familiar with their company's health, safety and environmental policies, procedures and guidelines.

Revised 12/99

Our Mission
We will achieve a premier level of safety performance for contractors working at Honeywell locations through increased safety awareness, communication of expectations, following work processes that reduce at-risk behaviors and ensuring the proper management of incidents.

Our Commitment
We recognize that outstanding safety performance is essential to the welfare of our employees, contractors and to business excellence. We will continue to improve our global competitiveness by making safety an integral part of all business activities.

Our Safety Principles
- We strive to prevent all incidents that may lead to injuries or illnesses.
- Safety performance is a responsibility of line management and every contractor.
- We design safety into the work place.
- Individual behavior is the most important factor in preventing incidents.
- We expect and require every contractor to work safely.
- Working safely is good business.
- Safety is an integral part of our culture and total quality processes.
- Our safety process must react to all incidents, not just accidents.
- We continually improve our safety process by auditing the process and correcting the root cause of deficiencies.
- We promote safety, both on and off the job.
- We prepare for emergencies.

Table of Contents

A. Introduction

- This handbook sets forth the safety requirements of Honeywell International Inc. ("Honeywell")
- At Honeywell, it is our policy to provide a safe and healthful place in which to work. It is everyone's obligation to work safely and to correct unsafe acts, practices and/or conditions for the protection of yourself and others.
- It is extremely important that you understand how your work is to be done in a safe manner. If you don't know, stop and ask before you begin work.
- All work must conform to plant, local, state, and federal (OSHA) regulations (CFR 29 Part 1910 and 1926).
- The information in this handbook is general in nature and is to be considered the minimum.
  S ave
  A ll
  F ellow
  E mployees
  T his
  Y ear
- During your orientation, you will be informed of the specific safety requirements for your particular site or plant.

B. General Information

Site Entry

- Personnel, vehicles, and equipment are subject to search upon entering or exiting the site premises.
- Personnel may be required to pass a drug test or show proof of passing a drug test within the past thirty (30) days prior to working at the site.

Vehicle Safety

- Operators of vehicles and equipment shall observe all site traffic regulations. Seat belts are to be worn at all times.

Pedestrians

- Pedestrians have the right of way. Pedestrians should use walkways where provided and should not take shortcuts through operating areas, buildings or other areas.

Cameras

- Cameras are not allowed on site without the proper authorization.

Running

- Running is not permitted on site except in an extreme emergency.

Smoking

- Smoking is permitted in designated areas only. Discard smoking materials in approved containers.

Conduct

- Horseplay, fighting, gambling, sexual harassment and the possession or use of firearms, alcoholic beverages and illegal substances is strictly prohibited.

Dress Code

- Pants must cover top of steel-toed leather work shoe and be in good condition. Shirts must have at least 4" of sleeve. Long sleeve shirts may be required at specific locations or for certain tasks.

C. Emergency and Disaster Procedures

In the event there is an emergency, anyone can activate the alarm any time there is a:

- Serious injury or illness
- Fire
- Major spill or release

When an alarm sounds, the following rules are in effect:

- All flame or hot work permits for welding, cutting, and spark producing equipment will be suspended until the all-clear signal is given.
- Smoking is prohibited.
- All traffic will pull to the side of plant roads and shut off engines until the all-clear signal is given.
- Report to your assembly point / area (if previously designated), or contact your Honeywell host.

Site Specific Emergency and Disaster Procedures

- Each Honeywell plant is equipped with an emergency alarm system, designated assembly areas and emergency phone numbers. The specific guidelines for reporting emergencies and disasters should be determined in your orientation.

D. Personal Protective Equipment (PPE)

Head Protection

- Contractors are required to wear approved hard hats that meet ANSI Z89.1-1971. Hard hats must be in good condition and be worn with brim to the front.

Eyes and Ears

- Each employee should know the location of the nearest eye wash/safety shower station in their area before starting work.
- Contractors are required to wear approved ANSI Z87.1 safety glasses with rigid side shields. Additional eye/face protection will be required when performing certain tasks (e.g.: welding, burning, grinding, chipping, sawing, drilling, handling chemicals or corrosive liquids, and pouring concrete or molten materials.) Check plant procedures.
- Approved hearing protection must be worn as specified in all posted areas and while working with or around high noise level producing tools, machines or equipment.

Fingers, Hand and Wrist

- Gloves suitable for the job being performed shall be worn unless the job cannot be done with gloves or wearing gloves increases the hazard.
- Tool holders should be used when driving stakes and wedges or when holding star drills, bull pins or similar tools.

Foot Protection

- In accordance with OSHA 1910.136, all contractors must determine if hazards are present (or are likely to be present) that may require the use of safety footwear.
- Safety footwear for contractors must be in accordance with ANSI Z41-1991, constructed of industrial quality leather and without urethane soles.
- Rubber boots with safety toe protection are required on jobs subject to chemically hazardous conditions.
- Metatarsal protection should be worn when using jack hammers, tamps and similar equipment which has the potential for foot injury above the toes.

Respiratory

- Respirators used by contractors must meet NIOSH/MSHA standards.
- Respirators must be inspected regularly and stored in a dust-free container.
- Employees required to wear a respirator must have a physician's approval and be fit tested. Employees must be clean shaven in the facial area to obtain an acceptable seal.
- Contractor must keep records of qualified users.

Skin

- If the possibility of skin contact with chemicals exists, personal protective equipment required by Material Safety Data Sheets shall be worn.

E. Hazard Communication / Right To Know

Upon beginning work at a Honeywell facility, each individual has the right to know information concerning the hazardous properties of any materials he/she may come in contact with. Training regarding potential hazards must be given to each individual and will include, but not be limited to, the following:

- An explanation of the hazard communication standard and the training requirements.
- An explanation of the project hazard communication program and it's location.

- Notification of the locations of the hazardous chemicals.
- A description of the plant labeling and hazard rating system.
- A description of the Material Safety Data Sheet (MSDS), their use and location.

F. Permits

Certain types of work are not to be started until approval is given in the form of a signed permit. A written, properly authorized permit listed below may be required before you begin any activities in any production or operating area of the plant.

- **Work Permit** - required before any work can be started on any job in any area of the plant.
- **Line Breaking Permit** - required before breaking screwed, flanged, welded or other type joints on pipelines or vessels containing hazardous materials, or breaking into (disconnecting, drilling, sawing, etc.) non-hazardous materials under pressure.
- **Confined Space or Vessel Entry Permit** - required before entering tanks, vessels, manholes or similar confined spaces that have been in service or connected to operating process equipment and may contain potentially hazardous atmospheric conditions.
- **Lockout / Tagout Permit** - required for the service and maintenance of machines and equipment in which the *unexpected* energization or start up of the machines or equipment, or release of stored energy could cause injury to workers.
- **Excavation Permit** - required to minimize hazards during excavation work and ground breaking operations, specifically when a machine or hand tools are used at a depth greater than one foot. Excavations greater than four foot in depth must be inspected and approved by a competent person and have a Confined Space permit before access by personnel.
- **Hot Work Permit** - required before any flame or spark producing activity can begin in any production,

operating, or some construction areas of the plant. This includes, but is not limited to:

- Welding / Repair of pipe lines under pressure greater than 5 PSI.
- Welding / Repair of pipe lines containing hazardous or flammable materials.
- Welding / Repair on any pressure vessel, fired or unfired, under pressure or in the presence of hazardous or flammable materials.
- Work on energized circuits.
- Cutting / Burning of pipe lines, vessels, equipment, etc. that may have contained any hazardous material.
- Grinding
- Any hot work on carbon steel pipe lines, vessels, equipment, etc. that may have contained sulfuric acid will not be permitted without extensive review with project and plant personnel due to the possible generation of hydrogen gas.

Each plant may have permits that are required for other specific work procedures. Check with your supervisor for these permits.

G. Fall Protection

- 100% fall protection (i.e. two lanyards when moving in certain areas) is required for all work above six (6) feet.
- Safety full body harnesses must be arranged so the d-ring is in the rear.
- Safety belts are not to be used for support or as a lineman's belt.
- Lanyards must be secured to an anchorage point overhead that can support 5,000 lbs. using as short a line as possible, not to exceed five (5) feet..
- All fall protection equipment shall be inspected by the user prior to each use.
- Lanyards may not be tied-off to any pipe/conduit less than 2" in diameter.
- Safety harnesses shall be worn and tied off when performing work on the following:

- Sloped roofs
- Flat roofs without handrails, if within 6 feet of the edge of the roof or opening
- Any suspended platform or stage
- All scaffolding six (6) feet above supporting work surface
- When working on the sixth step or higher on a ladder
- Ladders near the edge of roofs or floor openings
- Any unguarded areas six (6) feet above any supporting work surface
- An aerial lift.

H. Barricades, Signs, and Floor Openings

All floor openings/penetrations (i.e. holes > 2") must be properly covered or guarded. Barricades and signs must be posted when working in or around the following:

- All manlifts and the immediate working area.
- In ceilings, pipe bridges, etc.
- Removing roofing panels, walls, etc.
- Swing radius of cranes and the area where the lift will be made and moved to.
- Any open excavation.
- Any confined space entry.

Types of Barricades

- Warning barricades call your attention to a hazard but offer no physical protection. Examples: yellow, red, blue synthetic tape on stands or posts, plastic, or wooden snow fence.
- Protective barricades warn and provide physical protection and shall withstand 200 lbs. of force in any direction with minimal deflection (3"). Examples: wood post and rail, cable and wood post and chain.

Guidelines

- Barricades shall be 42 inches high and maintained square and level.
- Barricades shall be erected before any work

begins.

- Blinking lights must be used on road blocks after dark.
- An access opening or gate should be provided where practical.
- Barricades and signs shall be fully informative, legible, and visibly displayed.
- Barricades and signs shall be removed when no longer needed.

Hole Covers

- Must be installed immediately.
- Hole covers or barricades are required at any floor elevation.
- Material and equipment must not be stored on a hole cover.
- Must be secured to prevent movement and be marked with the word "HOLE" or "COVER".
- Must extend adequately beyond the edge of the opening (i.e. 3") and must not be more than 1" high.
- 3/4" plywood will be used providing the opening is less than 18". For any opening greater than 18 inches, 2 inch lumber of doubled ¾ inch plywood is required.

I. Ladders and Scaffolds

- Inspect ladders before use - identify defective ladders with "Do Not Use" tag.
- Only a "Type I" ladder with a minimum rating of 250 lbs. is acceptable.
- Metal ladders are prohibited.
- Fall protection must be worn when working on the sixth step or higher.
- When ascending and descending a ladder, face the approved side of the ladder, use at least one hand to grasp the ladder, and do not carry tools or materials in your hands.
- *All* ladders shall have a tie-off rope, non-skid safety feet and be tied-off.

- Never work off a ladder where the midpoint of the body (i.e. belt buckle) must be extended beyond the side rails.

Straight or Extension Ladders

- Follow the 4-to-1 rule when using an extension or straight ladder - position the base of the ladder one (1) foot from the supporting structure for every four (4) foot in height.
- If a ladder is used to reach a higher platform, the top of the ladder must extend three (3) feet past the platform.
- Do not work off of the top three (3) rungs of any straight or extension ladder.

Step Ladders

- Step ladders shall be set with all four (4) feet level.
- Ladders used in traffic areas must be secured or barricaded to prevent displacement.
- Never work off of the top two steps of step ladder.
- Never stand or sit on top of step ladders.

Scaffolding

- All scaffolds must conform to the OSHA Standard (Subpart L)
- All scaffolds are to be erected level - plumb on a firm base.
- When space allows, all scaffolds must be equipped with access ladders that extends three (3) feet past the landing gate. At landings, 42" high handrails rigidly secure, 21" high mid-rails rigidly secure, completely decked with safety planking or manufactured scaffold decking and rigidly secured toeboards on all four sides.
- A competent person must determine the feasibility and safety of providing fall protection for employees erecting and dismantling scaffolds, and train those employees accordingly.
- All scaffolds shall have a tag attached, completed by the competent person, stating what type of fall arrest system is required.
- All personnel working on scaffolds must be trained by a qualified person in the subject matter to

recognize the hazards associated with the type of scaffold being used and the nature of any hazards (i.e. electrical, fall, falling objects, etc.).

- Retraining must be provided where inadequacies in an affected employee's work practices involving scaffolds are observed.
- Safety harness and tie-off required when working from scaffolding over one buck high.
- Personnel shall not climb or do any rigging from a scaffold, handrail, mid-rail or braces.
- No one may alter any scaffold member by welding, burning, cutting, drilling or bending.
- Scaffolds shall be tied off or stabilized with outriggers when its height exceeds three times the smaller dimension of its base, but tie-offs must not exceed 26 feet vertically.
- Scaffolds must be tied off horizontally every 30 feet.
- No one shall ride on a rolling scaffold when it is being moved. All tools and materials shall be removed or secured to the decking before moving the scaffold.

J. Housekeeping

Good housekeeping plays a key role in preventing accidents and fires. Good housekeeping is emphasized as a vital safety measure.

- Keep everything in its proper place - store materials and equipment in a safe and orderly manner.
- Put trash, scrap materials and other waste in the proper containers.
- Clean up tools and work areas as your job progresses - do not wait until the end of the work day.
- Keep the floor of the work area clear of tools, cords, and scrap materials.
- Insure that work tables are occupied only by work at hand and tools required for work being done.
- All work areas are to be left in orderly and clean condition at the end of each work day.

- Keep cords and hoses at least seven (7) feet overhead over walkways and work areas or lay them flat outside of walkways.
- Maintain clear access to all work areas. Do not block fire extinguishers, emergency equipment, electrical boxes or panels, or other safety/fire equipment.

K. Tools - Hand and Power

- Do not operate any tool without proper instruction.
- Only qualified persons are to use tools and equipment.
- Honeywell tools and equipment are not to be used by contractors.
- Do not use any tool or equipment for any purpose other than that for which it was designed.
- Personal tools are subject to inspection at any time.
- It is your responsibility to inspect all tools prior to each use. Do not use a tool that is deemed defective. Report and tag all defective tools.
- Do not lift electrical tools by the cord.
- Tools may be inspected and marked with color-coded tape each month. Check with your Supervisor for designations and do not use a tool without the appropriate color-coded tape.

Hand Tools

- Worn tools are dangerous! Replace or repair the tool.
- Every tool was designed to do a certain job. Use a tool for its intended use only.
- Tools subject to impact (chisels, star drills and caulking irons) tend to "mushroom." Keep them dressed to avoid flying spalls. Use tool holders.
- Don't force tools beyond their capacity or use "cheaters" to increase their capacity.

Power Tools

- Material should be secured when power tools are applied to it.

- Each power tool should be examined for damaged parts, loose fittings, and frayed or cut electrical cords before use.
- Portable electrical equipment and tools shall be grounded unless "double insulated." A ground fault circuit interrupter (G.F.C.I.) shall be used for working in damp areas when using permanent plant power or as otherwise required.
- Electrical cords shall be unplugged and air lines deactivated and bled down before adjusting, servicing, repairing, or changing bits and blades in electrical or pneumatic tools.
- Any pneumatic hoses exceeding ½ inch in diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure. All hose connections shall be properly secured.
- All tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.
- Only licensed and qualified personnel shall be allowed to operate power-actuated tools.
- Power tools should be unplugged when not in use.

L. Mobile Equipment

- Anyone who operates any mobile equipment (cranes, manlifts, pick-ups, forklifts, etc.) must demonstrate knowledge and competency for each make of equipment.
- All equipment will be inspected daily before use to insure it is in proper operating condition. If the equipment becomes defective in any way, notify your supervisor at once and place a "DANGER - DO NOT USE" tag on it.
- All equipment is to be supplied with seat belts, back-up alarm and fire extinguishers (back-up alarm is not required on pickup trucks.)
- Use of gas/diesel equipment inside operating building is prohibited unless approved by the Safety Department.

M. Cranes

- All operators must be certified and licensed to operate each make and model of crane.
- The operator is solely responsible for the safe operation of the crane.
- The operator has full responsibility for the safety of a lift and may not make a lift until safety is assured.
- A copy of the load chart, manufacturer's operators' manual and inspection record must be in the crane cab or on project site.
- All cranes and the immediate work area must be barricaded at all times.
- No load shall be swung over any persons.
- Outriggers must be leveled and fully extended when making a lift.
- No part of the crane, load, hoist (load and boom) lines, boom and tag line shall come within 10 feet of energized electrical lines.
- For pick and carry operations, consult the manufacturer's operator manual.
- Riding on crane hooks and/or "headache" balls is prohibited.
- Operators are not permitted to leave the crane while holding a live load.
- The use of suspended personnel platforms (crane baskets) must meet all OSHA requirements. The use of a crane or derrick to hoist employees on a personnel platform is prohibited unless all requirements of 1926.550 (g) are met. A company plan and check list must be used.
- A lift plan is required for any critical lift.
- Lifting in high winds (e.g. greater than 20 mph) is not recommended.

N. Material Handling Equipment

- All material handling machines must have backup alarms, horns, rollover protection structures and seat belts when provided by manufacturer.
- The operator must be trained to operate each make and model of machine.

O. Personnel Lifting Equipment

- The operator must be trained to operate all personnel lifts.
- All employees are to have a safety belt or safety harness on and tied off when working out of: manual personnel lifts, power platform lifts, scissors lifts, high-reach lifts, etc.
- Tie-off shall be made to the lifting equipment.
- Personnel are not to get under lifts.
- When exiting the lifting equipment onto a proper working elevated platform, the employee must be tied off to that platform immediately prior to, and during, that exit.

P. Cars, Pickups, and Trucks

You must have a valid driver's permit to operate any vehicles on plant property. You must obey the following rules:

- Wear your seat belt.
- Obey plant speed limits and stop signs.
- Motors must be shut-off when refueling.
- Stop at all railroad crossings.
- No more than three (3) people on a front bench seat, two (2) people if bucket seats.
- Mount and dismount the vehicle only when it is stopped.
- Keep arms, feet and bodies inside the vehicle.
- Look to the rear and sound your horn before backing up.
- Inspect the vehicle each day before use.
- Riding in the rear of a truck is prohibited unless approved seating with seat belts has been provided.

Q. Rigging

- All personnel who perform or assist in rigging operations shall have received appropriate training and be competent.
- Only ONE eye in a hook. Use a shackle to hold two (2) or more eyes.

- Tag lines are required to control lifted loads made by mechanical equipment. Never put hands on a load or wrap tag lines around your hands or body.
- Never raise a load over other people.
- Know the capacities of the rigging equipment and the weights of the loads.
- Never rig from any structural member until you are sure it will support the load.
- Never use plate grips, tongs, pipe clamps, etc. as substitutes for beam clamps.
- Two slings will be used unless impractical. If one sling is used, double wrapping is required.
- Continuous synthetic slings may be used only when heat or chemicals are not a factor, and where load permits.
- Flat nylon straps should not be used for erecting steel. Wide nylon straps may be used for lifting tube bundles, fiberglass ducts or other material that could be damaged by a metal sling. The use of flat nylon strap with any visible tear or defect is strictly prohibited.
- Steel slings should be used where heat or chemicals are a potential factor. The use of steel slings with damaged strands or other defect is strictly prohibited.
- The use of a come-a-longs with cracked or damaged handles is strictly prohibited.
- Chainfalls and come-a-longs must have OSHA approved safety spring return latches on all hooks.
- Daily, weekly, and monthly inspection records will be kept by the contractor.

R. Chain Falls and Hoists

- Inspect hoists daily (operations), monthly (maintenance) and annually (3rd party vendor).
- A chain hoist must be used within its rated capacity, marked on the equipment.
- Do not leave an unsecured and unattended load hanging on a hoist or chain fall.
- Do not stand or have any part of the body below a load suspended on a chain hoist.

- Do not wrap the load chain around the load to be lifted.
- Use of "cheater bars" is strictly prohibited.
- Use a shackle to connect straps to a hook.

S. Fire Protection and Prevention

- Be sure to locate the nearest fire extinguishers in your work area before starting work.
- As warranted by the project, a trained and equipped fire fighting organization (Fire Brigade) will be provided to assure adequate protection of life.
- All fire hydrants, fire extinguishers, fire blankets, etc. shall be clearly marked and not obstructed.
- Combustible materials shall be kept away from steam lines, radiators, heaters, hot process and service lines.
- For any job requiring hot work or open flame or welding, a fire extinguisher must be within 20 feet of where the work is taking place.
- Fire extinguishers shall be checked daily before starting work.
- Portable power equipment must not be refueled while running or when hot. Attach the ground wire before refueling.
- Store flammables in properly labeled metal type containers and in designated areas.
- Fire blankets must be used to protect equipment, control panels, instrumentation, etc. when welding, cutting, burning, or grinding overhead.
- "Borrowing" plant fire extinguishers is not permitted.

T. Material Handling / Stability Control

Proper material handling and stability control insures that personnel, material, and equipment are safe from unexpected movement such as falling, slipping, rolling, tripping, or any other uncontrolled motion.

- Clean up ragged metal edges.
- Pull all protruding nails and wires or bend them flush.
- Set on dunnage for ease of handling.

- Check all material and equipment to prevent rolling.
- Tie down all light, large-surface-area material that might be moved by the wind.
- Put absorbent on all grease and oil spills immediately and clean them up. Notify proper plant personnel of spills if significant.
- Salt or sand icy walk areas immediately.
- Use proper lifting techniques when moving material by hand.
- Know the weight of the object to be handled.
- Protect the area around and below you.

U. Welding and Burning

General

- Before beginning any flame or spark producing operations in the plant, check with your supervisor about any permits that may be required. Follow the requirements on the permit.
- Keep welding leads and burning hoses clear of passageways.
- Each welder is responsible for containing sparks and slag and/or removing combustibles to prevent fires. The welder is also responsible for making sure there is a fire watch and a good fire extinguisher for the duration of the operation.
- Provide adequate screens to protect vision of general public.

Welding - Electric

- All work must have a separate and adequate ground.
- Welding rods are not to be left in the electrode holder when not in use. Stub ends are to be put in proper containers - not on the floor.
- All weld arcs shall be shielded.
- All welding machines are to be shut off when not in use.
- Hard hats with the brim to the front must be worn during welding operations by the welder.

- An approved welding shield must be worn. Use no less than a No. 10 filter plate with safety plate on both sides of the filter plate.
- Powered welding machines should be operated in well ventilated area only and will be diesel fueled only, unless otherwise approved by safety.

Burning - Gas

- The operation of oxygen and fuel gas burning equipment shall only be done by trained and experienced personnel.
- Do not exceed 15 P.S.I. on the torch side of the gauge when using acetylene.
- Only an approved spark lighter should be used to light a burning torch. Do not use matches, cigarettes, lighters or hot work.
- Always clean burning tips with the proper type cleaner.
- All burning rigs must be broken down at the end of the shift with regulators removed and caps screwed down hand tight.
- Approved burning goggles must be worn and No. 4 lenses or darker must be used.
- Keep oil and grease away from oxygen regulators, hoses and fittings. Do not store wrenches, dies, cutters, or other grease covered tools in the same compartment with oxygen equipment.
- Compressed gas bottles shall be kept in bottle carts or secured in an upright position. They must be transported and stored in a secured, upright position with protective caps in place.
- Oxygen and acetylene compressed gas bottles should not be stored together. They must be stored a minimum of 20' apart or have a 5 feet high, 30 minute rated fireproof wall between the two bottles.
- All gauges, hoses, and torches should be inspected on a regular basis. A back flow preventer is required on all regulators.
- When in use, place cylinders and hoses where they are not exposed to sparks and slag from the burning operation.

- Any hot work on carbon steel pipe lines, vessels, equipment, etc. that may have contained sulfuric acid will not be permitted without extensive review with project and plant personnel due to the possible generation of hydrogen gas.
- Handle cylinders with care.
- Lift to upper levels with approved carts only.
- Do not strike an arc on cylinders.
- Do not use cylinders as rollers.
- Do not lift with slings or by the protective cap.

Protective Clothing

- Only cotton, woolen, leather or special fire retardant synthetic clothing should be worn when burning or welding. Synthetics are very flammable and melt and cause more serious burns when exposed to flames and high temperatures.

V. Steel Erection

General

- 100% tie-off is required at ALL times
- Containers shall be provided for storing or carrying rivets, bolts and drift pins, and secured against accidental displacement when aloft.
- A load shall not be released from the hoisting line until the members are secured with not less than two bolts, or equivalent at each connection and drawn up wrench tight.
- Tag lines are required for controlling loads.
- When bolts, drift pins or rivet heads are being knocked out/off, means shall be provided to keep them from falling.
- Impact wrenches shall be provided with a locking device for retaining the socket.

W. Accident / Incident Investigation

- Notify Honeywell personnel (project engineer, plant safety, construction safety, etc.) immediately after

any injury (medical treatment and first aid cases), equipment or property damage, environmental excursions, or near-miss incidents.

- A Honeywell Contractor Incident Investigation Report shall be completed by the contractor company immediately upon knowledge of the incident.
- The report may be completed by an investigation team headed up by the contractor company, and assisted by the Honeywell project manager / engineer, site safety leader, the individual(s) involved and any other necessary personnel. All sections of the report are to be completed, signed and dated.

X. OSHA Reference Guide

Subject	Reference
Barricades	Subpart G - 1926.202 Barricades
Cars, Pickups & Trucks	Subpart O - 1926.601 Motor Vehicles
Chain Falls	Subpart H - 1926.251 Rigging Equip. for Mat. Handling
Compressed Gases	Subpart H - 1910.101 General Requirements
Concrete & Masonry	Subpart Q - 1926.700 Scope, Application & Requirements
Confined Space Entry	Subpart J - 1910.146 Permit-Required Confined Spaces
Cranes	Subpart N - 1926.550 Cranes & Derricks Subpart N - 1910.179 Overhead & Gantry Cranes
Demolition	Subpart T - 1926.850 Preparatory Operations
Egress	Subpart C - 1926.34 Means of Egress Subpart E - 1910.35 Definitions
Electrical	Subpart K - 1926.400 Introduction Subpart S - 1910.301 Introduction

Emergency Procedures	Subpart C - 1926.35 Employee Emergency Action Plans Subpart D - 1910.38 Employee Emergency Plans
Excavations	Subpart P - 1926.650 Scope, Application & Definitions
Eye Protection	Subpart E - 1926.102 Eye and Face Protection Subpart I - 1910.133 Eye and Face Protection

Subject	**Reference**
Fall Protection	Subpart E - 1926.104 Safety Belts, Lifelines & Lanyards Subpart M - 1926.500 Scope, Application & Definitions
Fire Protection	Subpart C - 1926.24 Fire Protection and Prevention Subpart F- 1926.150 Fire Protection Subpart L - 1910.155 Scope, Application & Definitions
First Aid	Subpart C - 1926.23 First Aid and Medical Attention Subpart D - 1926.50 Medical Services & First Aid Subpart K - 1910.151 Medical Services & First Aid
Floor Openings	Subpart M - 1926.502 Fall Protection Criteria & Practices Subpart D - 1910.23 Guarding Floor and Wall Openings
Foot Protection	Subpart E - 1926.96 Occupational Foot Protection Subpart I - 1910.136 Foot Protection
Hand Protection	Subpart I - 1910.138 Hand Protection

Hazard Communication	Subpart D - 1926.59 Hazard Communication
Hazardous Waste	Subpart D - 1926.65 Operations & Emergency Response Subpart H - 1910.120 Operations & Emerg. Response

Subject	Reference
Head Protection	Subpart E - 1926.100 Head Protection Subpart I - 1910.135 Head Protection
Hearing Protection	Subpart E - 1926.101 Hearing Protection Subpart G - 1910.95 Occupational Noise Exposure
Hoists	Subpart N - 1926.552 Mat. Hoist, Personnel Hoist & Elev.
Housekeeping	Subpart C - 1926.25 Housekeeping
Illumination	Subpart D - 1926.56 Illumination
Incident Investigation	Honeywell Contractor Near Miss/ Incident Investigation Report.
Ladders	Subpart X - 1926.1053 Ladders Subpart D - 1910.22 General Requirements
Lockout/ Tagout	Subpart K - 1926.417 Lockout and Tagging of Circuits Subpart J - 1910.147 Control of Hazardous Energy
Material Handling Equip.	Subpart O - 1926.602 Material Handling Equipment
Materials Handling	Subpart H - 1926.250 General Requirements for Storage
Mobile Equipment	Subpart O - 1926.600 Equipment
Permits	Per Site Specifics. Check With Your Site Contact.

Personal Protective Equip.	Subpart C - 1926.28 Personal Protective Equipment Subpart E - 1926.95 Criteria for Personal Protect. Equip. Subpart I - 1910.32 General Requirements

Subject	Reference
Personnel Lifting Equipment	Subpart L - 1926.453 Aerial Lifts Subpart N - 1926.552 Personnel Hoist & Elevators Subpart F - 1910.68 Manlifts
Respiratory Protection	Subpart E - 1926.103 Respiratory Protection Subpart I - 1910.134 Respiratory Protection
Rigging	Subpart H - 1926.251 Rigging Material Subpart N - 1910.184 Slings
Sanitation	Subpart D - 1926.51 Sanitation Subpart J - 1910.141 Sanitation
Scaffolds	Subpart L - 1926.451 Scope, Application & Definitions Subpart D - 1910.28 Safety Requirements for Scaffolding
Signaling	Subpart G - 1926.201 Signaling
Signs	Subpart G - 1926.200 Accident Prevention Signs & Tags Subpart J - 1910.145 Specifications for Signs & Tags
Stairways	Subpart X - 1926.1050 Scope, Application & Definitions
Steel Erection	Subpart R – 1926.750 Steel Erection
Tools - Hand & Power	Subpart I - 1926.300 General Requirements Subpart P - 1910.241 Definitions
Training & Orientation	Subpart C - 1926.21 Safety Training and Education Per Site Specifics. Check With Your Site Contact.

Ventilation	Subpart J - 1926.353 Ventilation and Protection Subpart G - 1910.94 Ventilation
Welding & Burning	Subpart J – 1926.350 Welding & Cutting Subpart Q - 1910.251 Definitions

Y. Acknowledgement Page - Read Carefully Before Signing Below

This is to acknowledge that I have received my copy of the Honeywell Contractor Safety Handbook and an orientation on its contents as well as other project rules and policies. I will read and abide by all rules and regulations in the handbook and any additional rules and regulations of my job. I understand that working safely, complying with and obeying any and all Company and Honeywell safety rules, regulations or standards is a condition of employment. Should I not comply with Company and/or Honeywell safety rules, regulations or standards, I am subject to disciplinary action including removal from the site and possible termination of employment. In consideration of my employment, I further agree that my employment and compensation can be terminated at any time, with or without cause or notice, at the option of either the Company or myself. I understand further that this handbook and the rules and regulations it contains do not in any way constitute a contract (either expressed or implied) of employment between the Company as my employer and me for any indefinite or specified period of time. The Company reserves the right to change its policies as summarized herein.

_____ _____

Print Full Name Signature

_____

Contractor Company Name

_____

Craft

_____

Honeywell Contact/Representative

_____

Date

Note: The perforated last page and the back cover of this booklet contain the same wording. After properly endorsed, the perforated page is to be removed and given to the Honeywell contact/representative.
Rev. 12/99

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ATTACHMENT 8
HEALTH AND SAFETY PLAN
JOB SAFETY ANALYSIS

PARSONS
JOB SAFETY ANALYSIS

SITE LOCATION:	**Quanta Site Edgewater, NJ**	JOB TITLE:	**Quanta RI/FS**	JSA NUMBER:	**07.14.03.01**
TASK:	**Sampling**	ANALYSIS BY:	**Andrew D. Soos**	DATE:	**11/14/03**
SUBTASKS	**Excavation/Drilling Associated with Soil/Solids Sampling**	REVIEWED BY:	**Paul Feshbach-Meriney**	DATE:	**11/14/03**
	Types of Sampling include: Surface collection with hand tool, Geoprobe or equivalent subsurface probe, and collection from an excavator bucket.	APPROVED BY:			

REQUIRED PERSONAL PROTECTIVE EQUIPMENT: Hard hat, safety shoes, safety glasses, hearing protection (as required), Level D clothing,

Step	Description	Hazard	Controls
General Chemical Exposure	Potential chemical exposure can be found throughout the site.	Various volatiles such as coal tars, benzene and toluene	PID monitoring to determine exposure and Action Levels (See HASP)
			Dust control measures such as wetting down of soil
			Wear proper PPE - latex inner glove and nitrile outer glove, Tyvek, and respirator (as shown in HASP)
			Follow proper decontamination procedures when leaving the "exclusion zone" (see HASP)
			Practice good personal hygiene; wash up before eating, eat or drink in designated clean areas
			Eyewash bottle or station to treat eye irritation
			Training (see HASP)
		High pH (basic) soil	Wear proper PPE - latex inner glove and nitrile outer glove, Tyvek, and respirator (as outlined in HASP)
			Follow proper decontamination procedures when leaving the "exclusion zone" (see HASP)

Step	Description	Hazard	Controls
			Practice good personal hygiene; wash up before eating, eat or drink in designated clean areas
			Training (see HASP)
			Eyewash bottle or station to treat eye irritation
1	Visual inspection of sampling site	Uneven site surface (slips, trips and falls)	Worker attention to walking/working surface
			Wearing appropriate safety footwear properly (such as boots with ankle support, laces tied, proper soles, etc.)
			Training (see HASP)
2	Mobilization of drill rig or excavator	Uneven site surface (rollover)	Visual inspection of access route to sampling areas for soft spots, holes, rocks, etc.
			Operator training
			Rollover protection (cab or equivalent)
		Overhead power lines and structures	Visual inspection of access route
			Operator training
3A	Breaking of soil with drill rig or other powered equipment and digging to required depth (<4 feet)	Noise of operating equipment	Wear necessary hearing protection (ear plugs, ear muffs, etc.) while equipment is operating
		Overhead hazard	Wear hard hat
		Open holes from excavation	Use barricades around excavation (as required).
		Underground utilities	Call 1-800 "Dig" hotline to have utility companies check site
		Pinch hazards of equipment	Review Standard Operating Procedures (SOP) for equipment
			No loose clothing or jewelry while operating equipment
		Flying objects	Wear appropriate PPE (such as safety glasses and hard hats. Goggles if a splash hazard. Face shield for a more severe exposure)
3B	Breaking of soil with hand tool	Underground utilities	Call 1-800 "Dig" hotline to have utility companies check site
		Flying objects	Wear appropriate PPE (such as safety glasses and hard hats. Goggles if a splash hazard. Face shield for a more severe exposure)
		Open holes from excavation	Use barricades around excavation (as required).
4	Excavated soil storage	Contaminating other areas	Store soil on an impermeable surface and tarpaulin
		Open hole	Use barricades around excavation (as required). Backfill, if possible
		Cave in, worker engulfment	Store excavated spoils > 3 feet from excavation edge

Step	Description	Hazard	Controls
5	Procuring sample from excavator bucket and placing in sample container	Struck by overhead hazards	Wear hard hat
			Pay attention to equipment operator (equipment operator must pay attention to you too!)
			Do not position your body between equipment and a fixed point if possible
			Be in communication with each other (radio, hand signals or verbal communication)
6	Field testing sample/excavation	Exposure to analytical chemicals	Follow SOP with field kit or field instrument for handling analytical chemicals or instrument
7	Packing sample for off-site shipment to lab	Accidental breakage of glass bottles	Wear cut-resistant gloves during packaging of glass bottles
			Training
		Chemical exposure	Wear necessary PPE (see potential chemical exposure section above and/or field kit SOP)
			Immediate clean-up of spills
8	Backfilling excavation	Worker engulfment (when hole is large enough to enter)	Check excavation prior to backfilling
9	De-mobilization of drill rig	Uneven site surface (rollover)	Visual inspection of access route to sampling areas for soft spots, holes, rocks, etc.
			Operator training
			Rollover protection (cab or equivalent)
		Overhead power lines and structures	Visual inspection of access route
			Operator training
		Equipment contamination	Decontamination (see HASP)
10	Sampling on/near/over water	Falling into water	Guard rails, harness, personal flotation device, life ring with 200 feet of roper, rescue boat, training,

Notes: 1. Uneven surfaces include the following: curbs, rocks, holes in ground, vegetation roots, rubble, debris, trash, ditches, berms, vegetation, broken pavement, loose objects, puddles, slippery areas, boxes, plastic bags etc.
2. PPE – Personal Protective Equipment
3. SOP – Standard Operating Procedure
4. HASP – Health and Safety Plan
5. Confined space entry into an excavation is not part of this JSA

JOB HISTORY INFORMATION:

DATE:	REMARKS: No previously reported incidents